FCC PART 90Y
ISEDC RSS-111, ISSUE 5, Sept 2014
TEST AND MEASUREMENT REPORT

For

Mimosa Networks, Inc.

469 El Camino Real, Suite 100,

Santa Clara, CA 95050, USA

FCC ID: 2ABZJ-100-00085
IC: 11823A-10000085

Report Type:	**Product type:**
Original Report	Point to Point Wireless Device

Prepared By:	Frank Wang Test Engineer
Report Number:	R18062717-90
Report Date:	2018-10-09
Reviewed By:	Xiao Lin RF Engineer

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R18062717-90	Original Report	2018-10-09

1. General Information

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Mimosa NetworksInc.*, and their product model: *C5x,* FCC ID: 2ABZJ-100-00085, IC: 11823A-10000085 or the "EUT" as referred to in this report. The product is a point to point/point to multipoint wireless device.

1.2 Objective

This type approval report is prepared on behalf of *Mimosa Networks Inc.* in accordance Part 90 of the Federal Communication Commissions.

The objective was to determine the RF output power, Power Spectral Density, Peak Excursion, Occupied Bandwidth, Emission Mask, Conducted and Radiated Spurious Emissions and Frequency Stability Behavior are in compliance with the FCC rules.

1.3 Related Submittal(s)/Grant(s)

R18062717-407 Report with FCC ID: 2ABZJ-100-00085, IC: 11823A-10000085

1.4 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI/TIA-603-E-2016 and ANSI C63.26-2015

All tests were performed at Bay Area Compliance Laboratories Corp.

1.5 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatabil

Parameter	Measurement uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.57 dB
Power Spectral Density, conducted	±1.48dB
Unwanted Emissions, conducted	±1.57dB
All emissions, radiated	±4.0 dB
AC power line Conducted Emission	±2.0 dB
Temperature	±2 º C
Humidity	±5 %
DC and low frequency voltages	±1.0 %
Time	±2 %
Duty Cycle	±3 %

1.6 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A-1, 3062A-2, and 3062A-3.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0027.

1.7 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

A- ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2005 by A2LA (Test Laboratory Accreditation Certificate Number 3279.02),*** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2005 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2005 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

B- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.03)*** to certify

- For the USA (Federal Communications Commission):
  - 1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
  - 2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
  - 3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Innovation, Science and Economic development Canada - ISEDC):
  - 1 All Scope 1-Licence-Exempt Radio Frequency Devices;
  - 2 All Scope 2-Licensed Personal Mobile Radio Services;
  - 3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
  - 4 All Scope 4-Licensed Maritime & Aviation Radio Services;
  - 5 All Scope 5-Licensed Fixed Microwave Radio Services
  - 6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Infocomm Media Development Authority - IMDA):
  - 1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
  - 2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2

- For the Hong Kong Special Administrative Region:

1 All Radio Equipment, per KHCA 10XX-series Specifications;
2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.

- For Japan:

1 MIC Telecommunication Business Law (Terminal Equipment):
- All Scope A1 - Terminal Equipment for the Purpose of Calls;
- All Scope A2 - Other Terminal Equipment

2 Radio Law (Radio Equipment):
- All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
- All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
- All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

C- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

1 Electronics and Office Equipment:
- for Telephony (ver. 3.0)
- for Audio/Video (ver. 3.0)
- for Battery Charging Systems (ver. 1.1)
- for Set-top Boxes & Cable Boxes (ver. 4.1)
- for Televisions (ver. 6.1)
- for Computers (ver. 6.0)
- for Displays (ver. 6.0)
- for Imaging Equipment (ver. 2.0)
- for Computer Servers (ver. 2.0)

2 Commercial Food Service Equipment
- for Commercial Dishwashers (ver. 2.0)
- for Commercial Ice Machines (ver. 2.0)
- for Commercial Ovens (ver. 2.1)
- for Commercial Refrigerators and Freezers

3 Lighting Products
- For Decorative Light Strings (ver. 1.5)
- For Luminaires (including sub-components) and Lamps (ver. 1.2)
- For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
- For Integral LED Lamps (ver. 1.4)

4 Heating, Ventilation, and AC Products
- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other
- For Water Coolers (ver. 3.0)

D- ***A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:***

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Innovation, Science and Economic development Canada - ISEDC) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):

  - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA)
  APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA - Phase I
- Singapore: (Infocomm Media Development Authority - IMDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
  - Nationally Recognized Test Laboratory (NRTL) – US OSHA
- Vietnam: APEC Tel MRA -Phase I;

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2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to TIA/EIA-603-E and ANSI C63.26.

The EUT was tested in the normal (native) operating mode to represent *worst*-case results during the final qualification test.

2.2 EUT Exercise Software

The test software used was Putty provided by *Mimosa Networks.* The software is compliant with the standard requirements being tested against.

Please refer to the following power setting table.

25 dBi Dish Antenna:

Modulation	Channel	Frequency (MHz)	Power Setting
VHT20	Low	4950	0
	Middle	4965	0
	High	4980	0

8 dBi Internal Antenna:

Modulation	Channel	Frequency (MHz)	Power Setting
VHT20	Low	4950	18
	Middle	4965	18
	High	4980	18

2.3 Equipment Modifications

There are two RF cables, one for each antenna port, coming out of the EUT to connect the antenna ports to the power spectrum analyzer.

2.4 Local Support Equipment

Manufacturer	Description	Model
Dell	Laptop	Latitude E6410

2.5 Support Equipment

Manufacturer	Description	Model
Lenovo	Laptop	P50s
Mimosa Networks	POE injector	G0566-500-120

2.6 Interface Ports and Cabling

Cable Description	Length (m)	To	From
Cat5e	~1	EUT	POE Injector
Cat5e	~1	POE Injector	Laptop

3 Summary of Test Results

FCC/ISEDC Rules	Description of Tests	Results
FCC §1.1310, §2.1091, ISEDC RSS-102 Issue 5	RF Exposure	Compliant
FCC §90.1215(a) ISEDC RSS-111 Issue 5 §5.3	RF Output Power	Compliant
FCC §90.1215(b) ISEDC RSS-111 Issue 5 §4.2	Power Spectral Density	Compliant
FCC §2.1049, §90.210 ISEDC RSS-111 Issue 5 §5.5	Occupied Bandwidth and Emission Mask	Compliant
FCC §90.1215(e), ISEDC RSS-111 Issue 5 §5.4	Peak Excursion	Compliant
FCC §90.210, §2.1051, ISEDC RSS-111 Issue 5 §5.5	Spurious Emissions at Antenna Terminals	Compliant
FCC §90.210, §2.1051, ISEDC RSS-111 Issue 5 §5.5	Radiated TX Spurious Emissions	Compliant
FCC §2.1055, §90.213 ISEDC RSS-119 Issue 5 §5.3	Frequency Stability	Compliant

4 FCC §2.1091 & ISEDC RSS-102 - RF Exposure

4.1 Applicable Standards

FCC §2.1091, (a) Requirements of this section are a consequence of Commission responsibilities under the National Environmental Policy Act to evaluate the environmental significance of its actions. See subpart I of part 1 of this chapter, in particular §1.1307(b).

Limits for Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*($900/f^2$)	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	842/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1	30

According to ISED RSS-102 Issue 5:

2.5.2 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz[6] and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

25 dBi Dish Antenna

4.9 GHz Radio

Maximum output power at antenna input terminal (dBm):	2.94
Maximum output power at antenna input terminal (mW):	1.97
Prediction distance (cm):	20
Prediction frequency (MHz):	4980
Maximum Antenna Gain, typical (dBi):	25
Maximum Antenna Gain (numeric):	316.23
Power density of prediction frequency at 20 cm (mW/cm^2):	0.124
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

8 dBi Internal Antenna

4.9 GHz Radio

Maximum peak output power at antenna input terminal (dBm):	19.45
Maximum peak output power at antenna input terminal (mW):	88.10
Prediction distance (cm):	20
Prediction frequency (MHz):	4950
Maximum Antenna Gain, typical (dBi):	8
Maximum Antenna Gain (numeric):	6.310
Power density of prediction frequency at 20 cm (mW/cm^2):	0.111
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

Conclusion

The device is compliant with the requirement MPE limit for uncontrolled exposure. All transceiver modules must be installed with a separation distance of no less than **20** cm from all persons.

4.3 RF exposure evaluation exemption for IC

25 dBi Dish Antenna**:**

2.94 + 25 dBi = 27.94 dBm < $1.31\times10^{-2}f^{0.6834}$ = 4.405 W = 36.44 dBm

8 dBi Internal Antenna:

19.45 + 8 dBi = 27.45 dBm < $1.31\times10^{-2}f^{0.6834}$ = 4.387 W = 36.42 dBm

Conclusion

Therefore the RF exposure is not required. All transceiver modules must be installed with a separation distance of no less than **20** cm from all persons.

5 FCC §90.1215(a) & ISEDC RSS-111 §5.3 - RF Output Power

5.1 Applicable Standard

According to FCC §90.1215, the transmitting power of stations operating in the 4940-4990 MHz band must not exceed the maximum limits in this section.

(a)(1) The maximum conducted output power should not exceed:

Channel bandwidth (MHz)	Low power maximum conducted output power (dBm)	High power maximum conducted output power (dBm)
1	7	20
5	14	27
10	17	30
15	18.8	31.8
20	20	33

According to ISEDC RSS-111 Section 5.3,

Equipment is classified as either a low-power or high-power device according to its maximum transmitted power and its channel bandwidth as described in the section below. The equipment's occupied bandwidth shall not exceed its channel bandwidth. The transmitted power of low- power and high-power devices shall not exceed the maximum limits corresponding to the equipment type given in Table 1.

Table 1 — Channel Bandwidth and Power Limits

Channel Bandwidth (MHz)	Transmitter Power, P (dBm)	
	Low-power Device	High-power Device
1	P ≤ 7	7 < P ≤ 20
5	P ≤ 14	14 < P ≤ 27
10	P ≤ 17	17 < P ≤ 30
15	P ≤ 18.8	18.8 < P ≤ 31.8
20	P ≤ 20	20 < P ≤ 33

5.2 Test Procedure

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

5.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Analyzer, Spectrum	E4446A	MY48250238	2018-05-08	1 year
-	RF cable	-	-	Each time[1]	N/A
-	20dB attenuator	-	-	Each time[1]	N/A

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

5.4 Test Environmental Conditions

Temperature:	20-25 °C
Relative Humidity:	44-55 %
ATM Pressure:	101-102 kPa

The testing was performed by Harry Zhao on 2018-10-09 in the RF Site.

5.5 Test Results

Dish Antenna – Antenna Gain 25 dBi

Frequency (MHz)	Output Power			
	Ant 1 (dBm)	Ant 2 (dBm)	Total (dBm)	Limit (dBm)
4950	0.22	-1.19	2.58	4
4965	0.34	-0.99	2.74	4
4980	0.54	-0.78	2.94	4

Note: Reduced Power Limit = Original Power Limit – (Antennta Gain - 9 dBi)

Internal Antenna – Antenna Gain 8 dBi

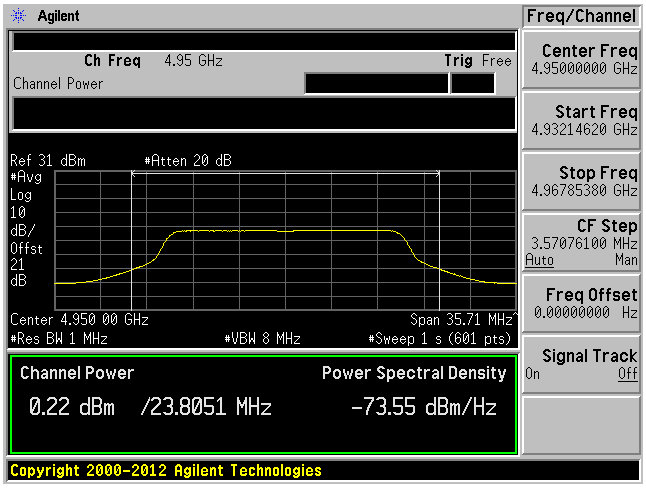
Frequency (MHz)	Output Power			
	Ant 1 (dBm)	Ant 2 (dBm)	Total (dBm)	Limit (dBm)
4950	17.12	15.63	19.45	20
4965	16.98	15.76	19.42	20
4980	16.81	15.95	19.41	20

Please refer to the following plots for conducted output power.

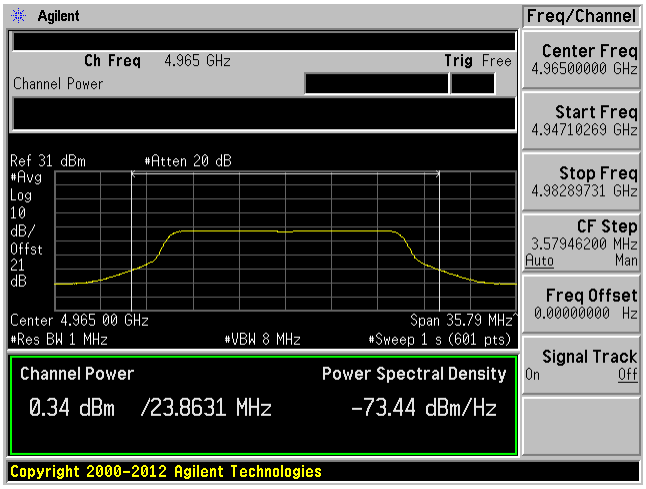
Dish Antenna

Antennna Port 1

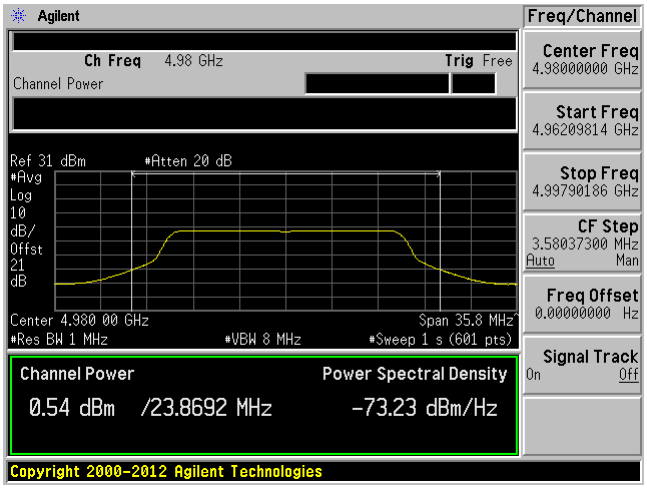
4950 MHz



4965 MHz

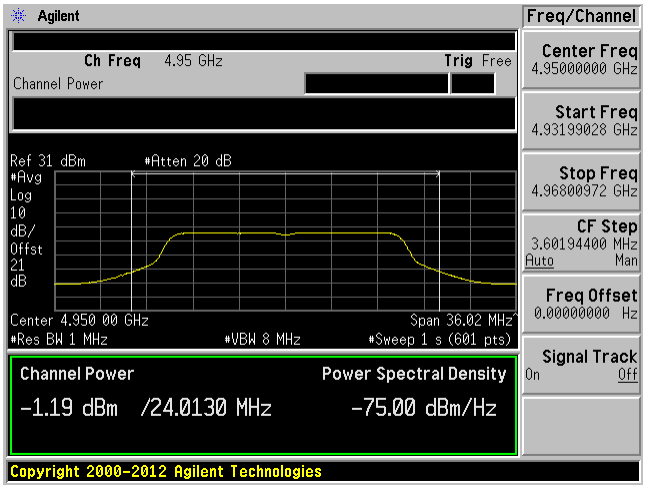


4980 MHz

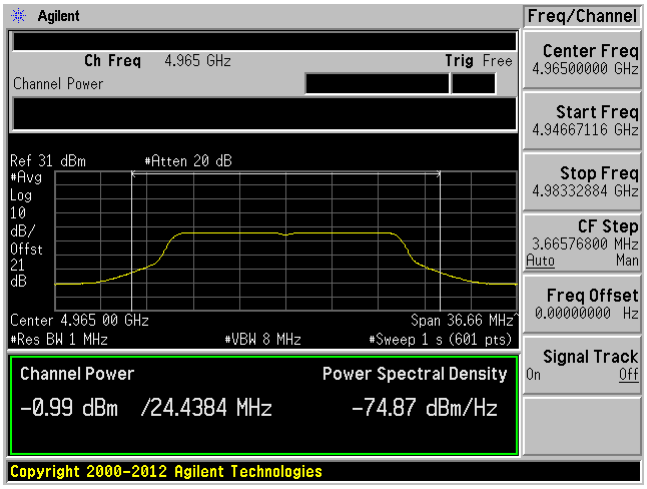


Antennna Port 2

4950 MHz



4965 MHz



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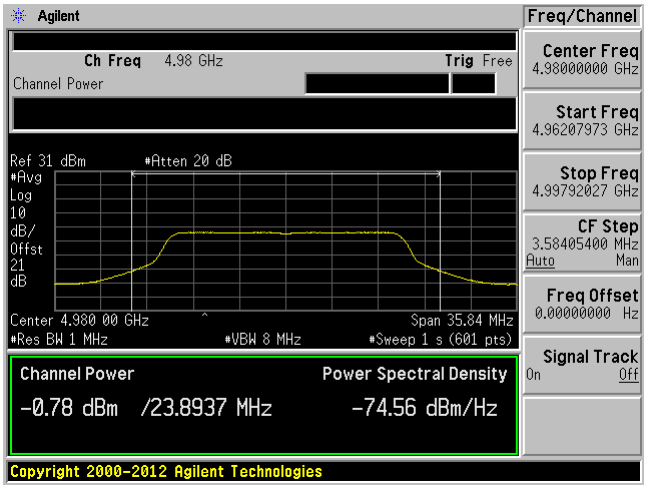
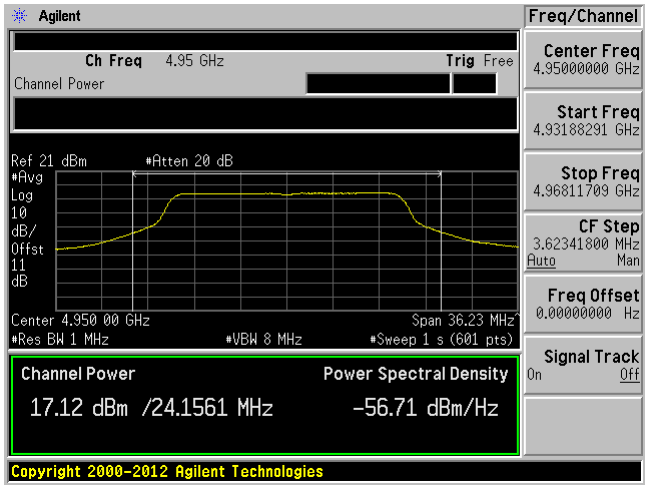


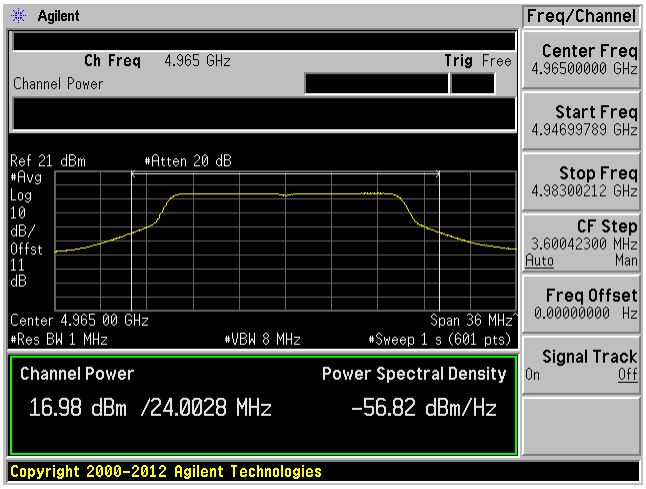
Internal Antenna

Antennna Port 1

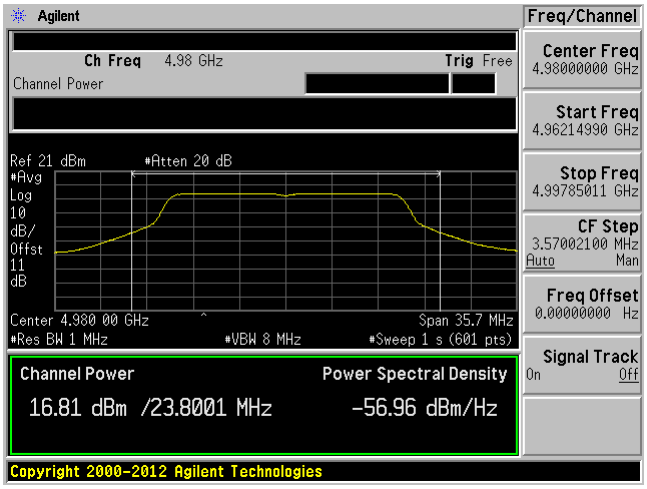
4950 MHz



4965 MHz

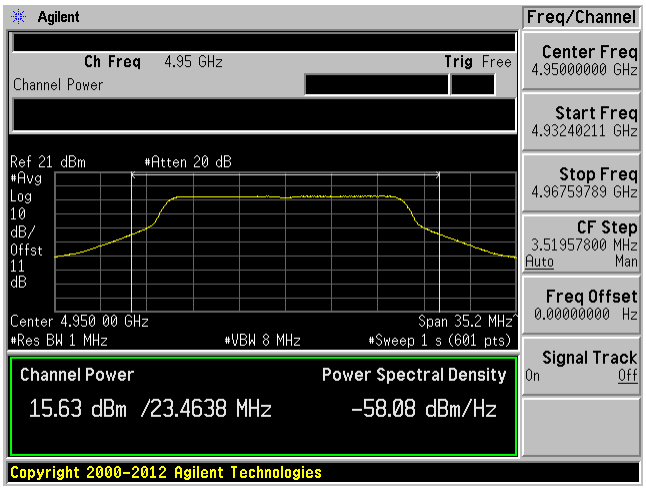


4980 MHz

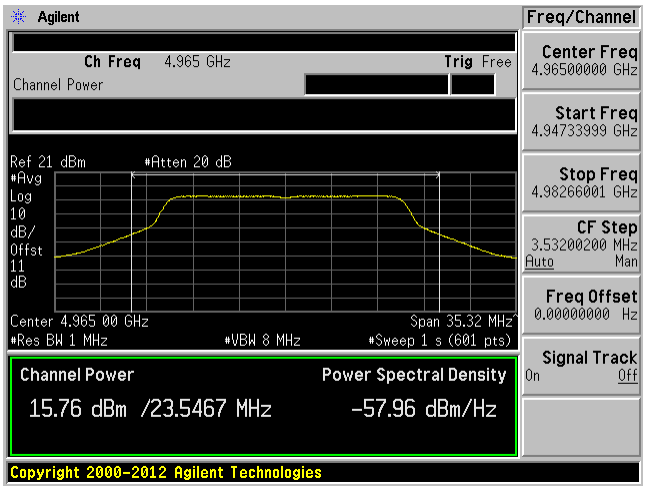


Antennna Port 2

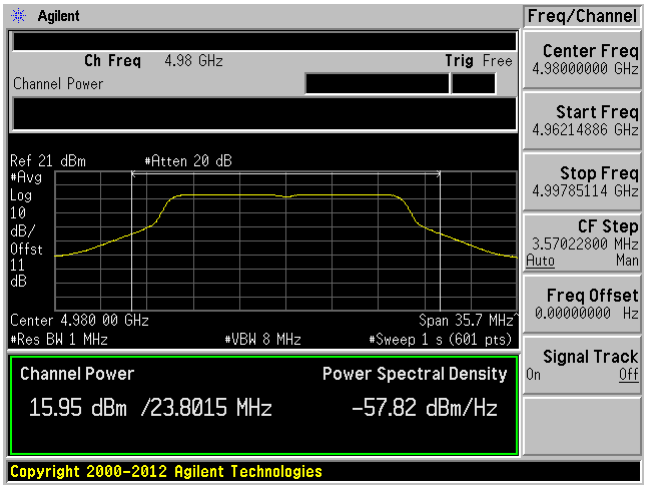
4950 MHz



4965 MHz



4980 MHz



6 FCC §90.1215(b) & ISEDC RSS-111 §4.2 - Power Spectral Density

6.1 Applicable Standard

According to FCC §90.1215,

(b) Low power devices are also limited to a peak power spectral density of 8 dBm per one MHz. Low power devices using channel bandwidths other than those listed above are permitted; however, they are limited to a peak power spectral density of 8 dBm/MHz. If transmitting antennas of directional gain greater than 9 dBi are used, both the maximum conducted output power and the peak power spectral density should be reduced by the amount in decibels that the directional gain of the antenna exceeds 9 dBi.

According to ISEDC RSS-111 Section 4.2,

The transmitter power spectral density shall be measured over a bandwidth of 1 MHz or 99% of the emission bandwidth, whichever is less, with the power measured as per Section 4.1. A resolution bandwidth less than the measurement bandwidth can be used provided that the measured power is integrated to show total power over the measurement bandwidth.

6.2 Test Procedure

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

6.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Analyzer, Spectrum	E4446A	MY48250238	2018-05-08	1 year
-	RF cable	-	-	Each time[1]	N/A
-	20dB attenuator	-	-	Each time[1]	N/A

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

6.4 Test Environmental Conditions

Temperature:	20-25 °C
Relative Humidity:	44-55 %
ATM Pressure:	101-102 kPa

The testing was performed by Harry Zhao on 2018-10-09 in the RF Site.

6.5 Test Results

Dish Antenna – Antenna Gain 25 dBi

Frequency (MHz)	Ant 1 (dBm/MHz)	Ant 2 (dBm/MHz)	Total (dBm/MHz)	Limit (dBm/MHz)
4950	-11.347	-13.040	-9.10	-8
4965	-11.400	-12.778	-9.02	-8
4980	-11.303	-12.500	-8.85	-8

Note: Reduced Power Limit = Original Power Limit – (Antennta Gain - 9 dBi)

Internal Antenna – Antenna Gain 8 dBi

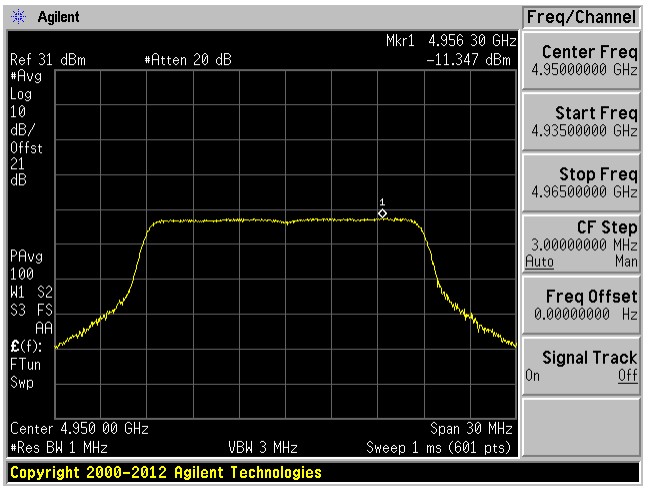
Frequency (MHz)	Ant 1 (dBm/MHz)	Ant 2 (dBm/MHz)	Total (dBm/MHz)	Limit (dBm/MHz)
4950	5.597	3.955	7.86	8
4965	5.184	4.080	7.68	8
4980	5.070	4.480	7.80	8

Please refer to the following plots.

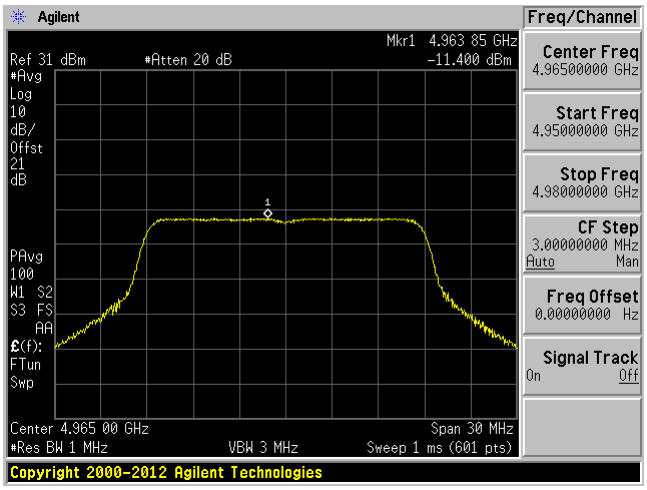
Dish Antenna

Antennna Port 1

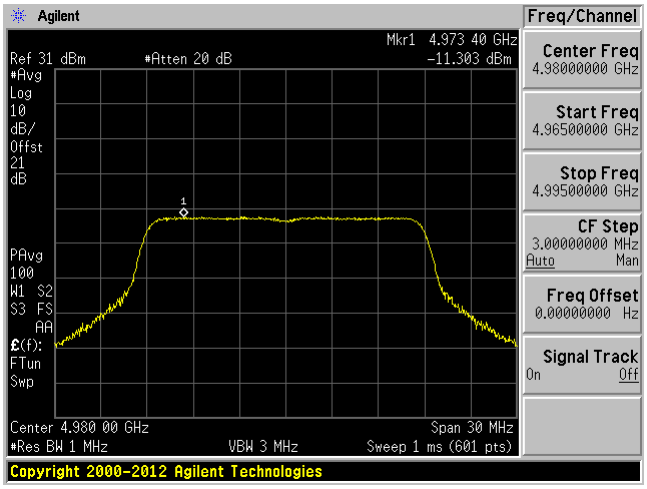
4950 MHz



4965 MHz

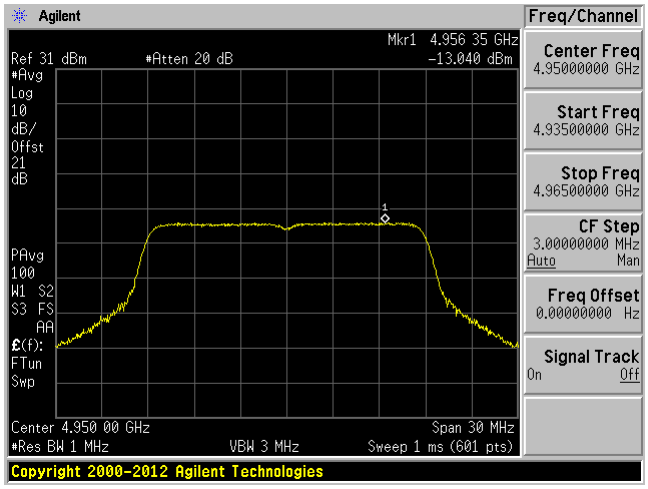


4980 MHz

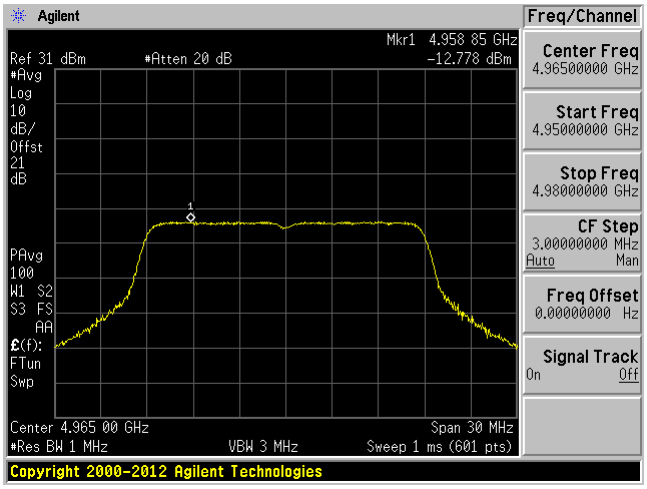


Antennna Port 2

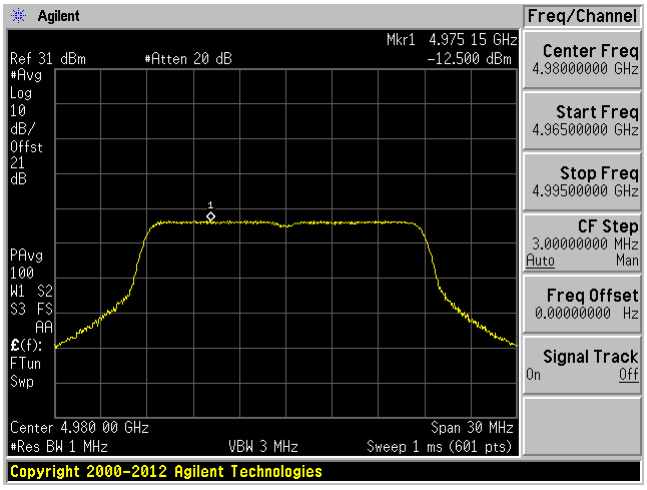
4950 MHz



4965 MHz



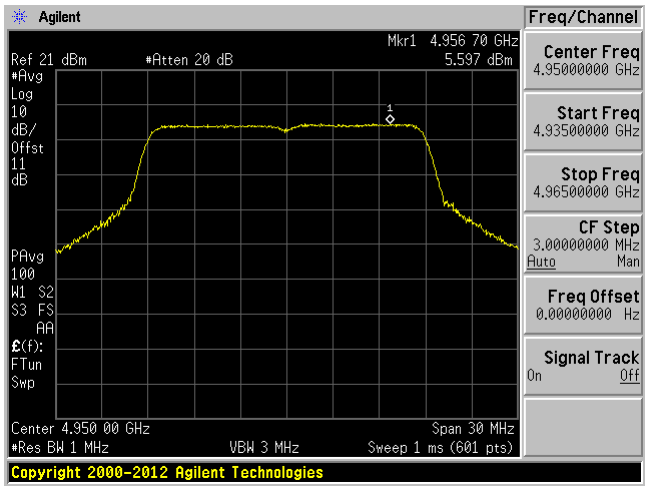
4980 MHz



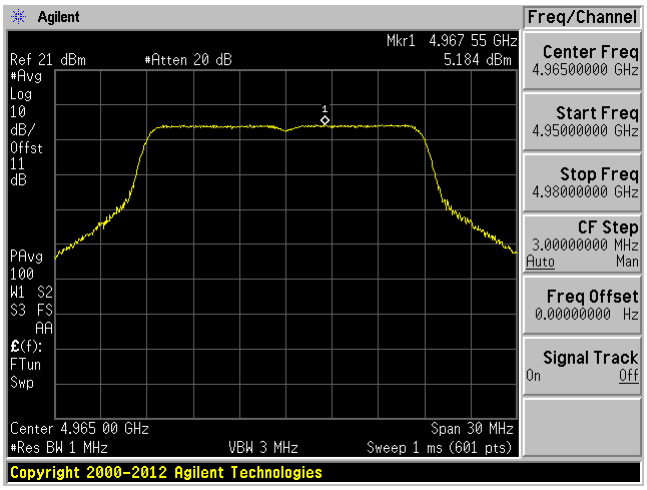
Internal Antenna

Antennna Port 1

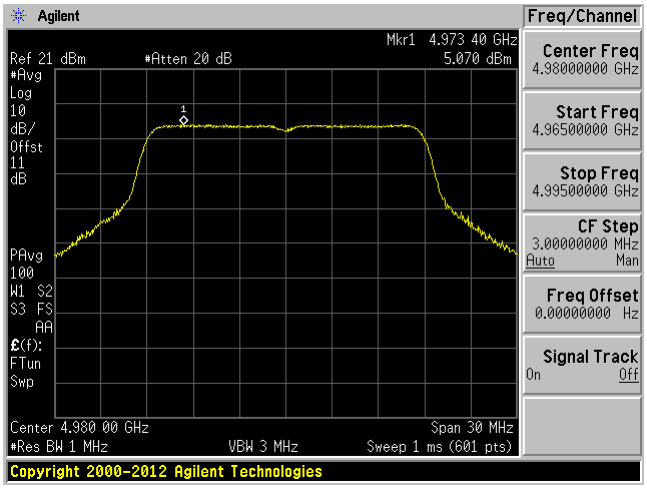
4950 MHz



4965 MHz

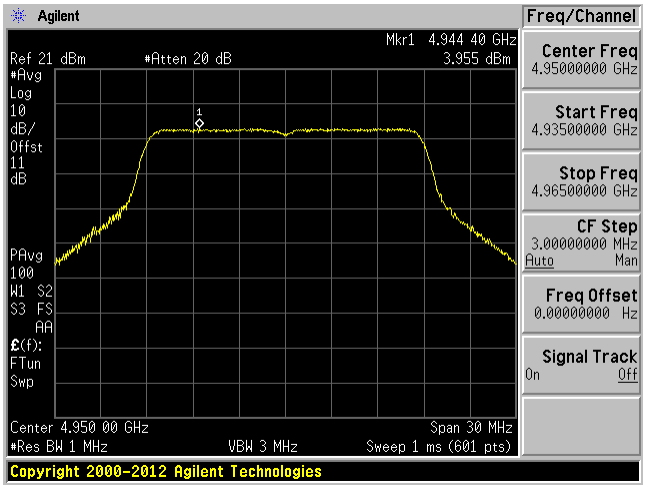


4980 MHz

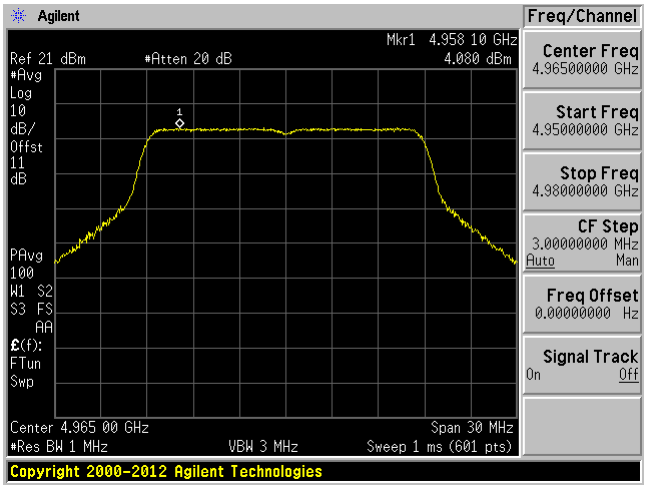


Antennna Port 2

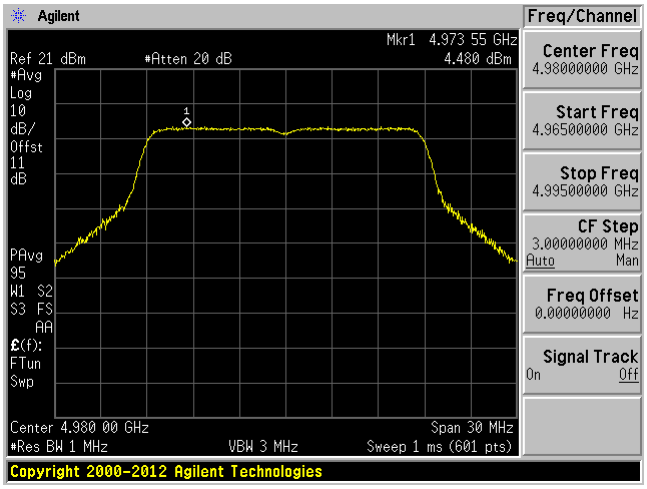
4950 MHz



4965 MHz



4980 MHz



7 FCC §2.1049, §90.210 & ISEDC RSS-111 §5.5 - Occupied Bandwidth & Emission Mask

7.1 Applicable Standard

FCC §90.210

(l) Emission Mask L. For low power transmitters (20 dBm or less) operating in the 4940-4990 MHz frequency band, the power spectral density of the emissions must be attenuated below the output power of the transmitter as follows:

(1) On any frequency removed from the assigned frequency between 0-45% of the authorized bandwidth (BW): 0 dB.

(2) On any frequency removed from the assigned frequency between 45-50% of the authorized bandwidth: 219 log (% of (BW)/45) dB.

(3) On any frequency removed from the assigned frequency between 50-55% of the authorized bandwidth: 10 + 242 log (% of (BW)/50) dB.

(4) On any frequency removed from the assigned frequency between 55-100% of the authorized bandwidth: 20 + 31 log (% of (BW)/55) dB attenuation.

(5) On any frequency removed from the assigned frequency between 100-150% of the authorized bandwidth: 28 + 68 log (% of (BW)/100) dB attenuation.

(6) On any frequency removed from the assigned frequency above 150% of the authorized bandwidth: 40 dB.

(7) The zero dB reference is measured relative to the highest average power of the fundamental emission measured across the designated channel bandwidth using a resolution bandwidth of at least one percent of the occupied bandwidth of the fundamental emission and a video bandwidth of 30 kHz. The power spectral density is the power measured within the resolution bandwidth of the measurement device divided by the resolution bandwidth of the measurement device. Emission levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least one percent of the occupied bandwidth.

ISEDC RSS-111,

5.5 Transmitter Unwanted Emissions
Transmitter unwanted emissions shall be measured according to the method described in Section 4.3.

On any frequency f, offset from the channel centre frequency fc by a separation fd (expressed as a percentage of the channel bandwidth), the power spectral density of the unwanted emissions for low- and high-power transmitters shall comply with the limits specified below in Table 2. Figure 1 shows the emission mask for low- and high-power transmitters. For equipment with multiple transmitters, the unwanted emissions of each transmitter shall comply with the emission limits based on the output power of the transmitter regardless of the total output power of the equipment (i.e. total output power from all the transmitters).

Table 2 — Emission Mask for Low- and High-power Transmitters		
Offset Frequency f_d (% of the Equipment's Channel Bandwidth)	Minimum Attenuation (dB)	
	Low-power Transmitter	High-power Transmitter
$0 < f_d \leq 45$	0	0
$45 < f_d \leq 50$	219 log (f_d/45)	568 log (f_d/45)
$50 < f_d \leq 55$	10 + 242 log (f_d/50)	26 + 145 log (f_d/50)
$55 < f_d \leq 100$	20 + 31 log (f_d/55)	32 + 31 log (f_d/55)
$100 < f_d \leq 150$	28 + 68 log (f_d/100)	40 + 57 log (f_d/100)
$f_d > 150$	40	whichever is less stringent 50 or 55 + 10 log p
Where: f_d (%) = ((f-f_c)/channel bandwidth) x 100 p: transmitter's output power (in watts), measured as per Section 4.1		

7.2 Test Procedure

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

The resolution bandwidth of the spectrum analyzer was set at 200 kHz.

7.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Analyzer, Spectrum	E4446A	MY48250238	2018-05-08	1 year
Rhode & Schwarz	Spectrum Analyzer	FSV40	1321.3008K3 9-101203-UW	2018-07-23	1 Year
-	RF cable	-	-	Each time[1]	N/A
-	20dB attenuator	-	-	Each time[1]	N/A

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

7.4 Test Environmental Conditions

Temperature:	20-25 °C
Relative Humidity:	44-55 %
ATM Pressure:	101-102 kPa

The testing was performed by Harry Zhao on 2018-10-06 in the RF Site.

7.5 Test Results

Dish Antenna – Antenna Gain 25 dBi

Frequency (MHz)	Occupied Bandwidth	
	Ant 1 (MHz)	Ant 2 (MHz)
4950	17.9711	17.8349
4965	17.9701	17.9876
4980	17.9635	17.8357

Internal Antenna – Antenna Gain 8 dBi

Frequency (MHz)	Occupied Bandwidth	
	Ant 1 (MHz)	Ant 2 (MHz)
4950	18.0294	17.8272
4965	18.0031	17.8199
4980	17.9984	17.8236

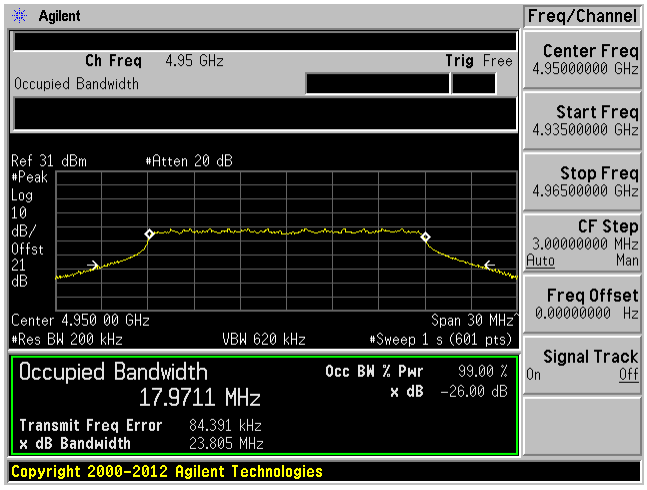
Please refer to the following plots.

Occupied Bandwidth

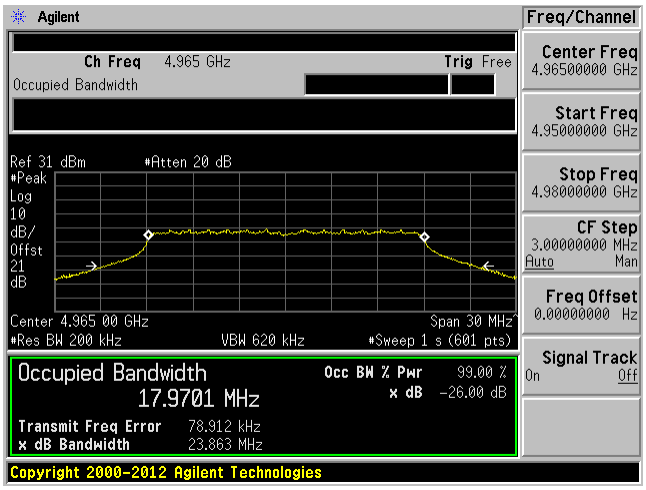
Dish Antenna

Antennna Port 1

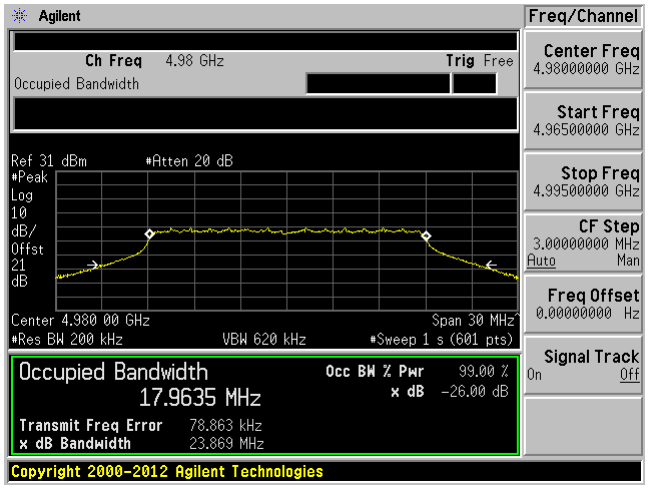
4950 MHz



4965 MHz

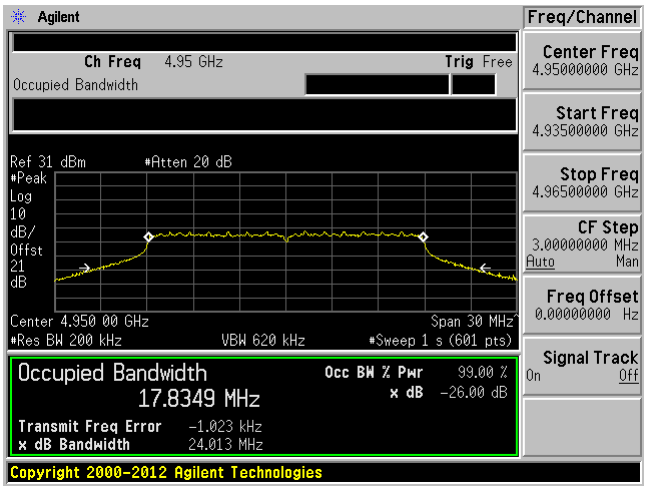


4980 MHz

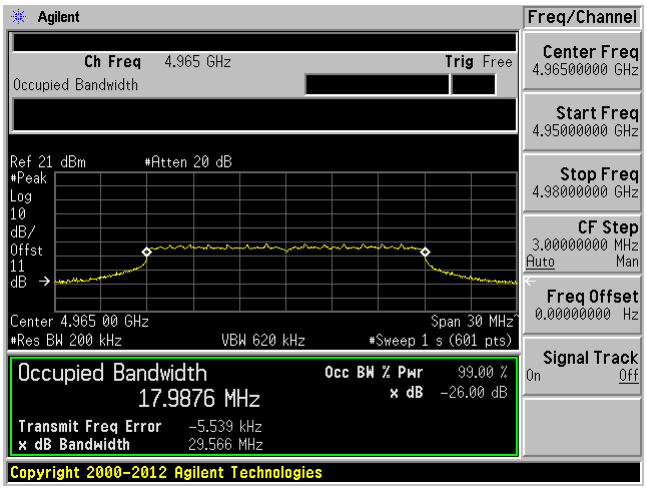


Antennna Port 2

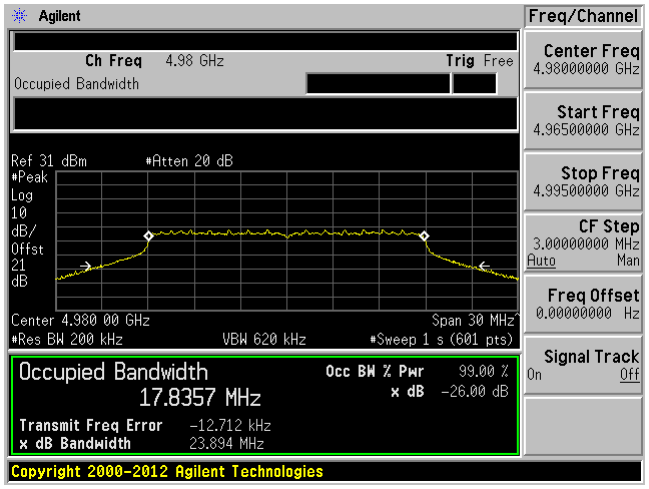
4950 MHz



4965 MHz



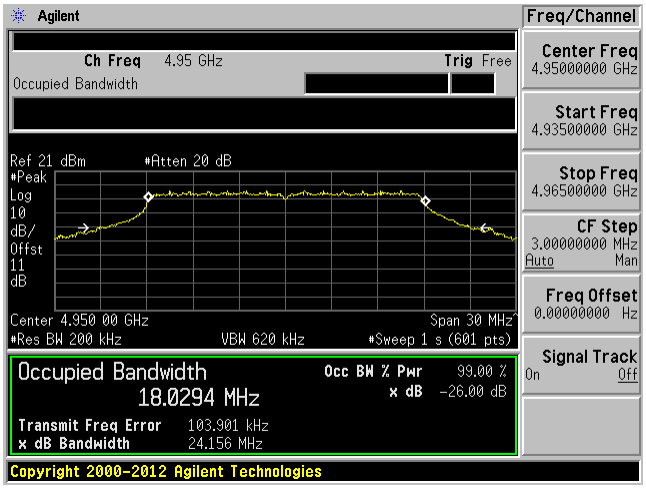
4980 MHz



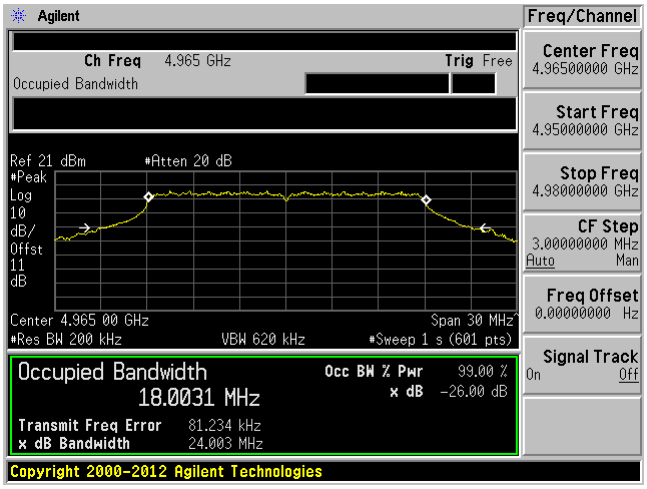
Internal Antenna

Antennna Port 1

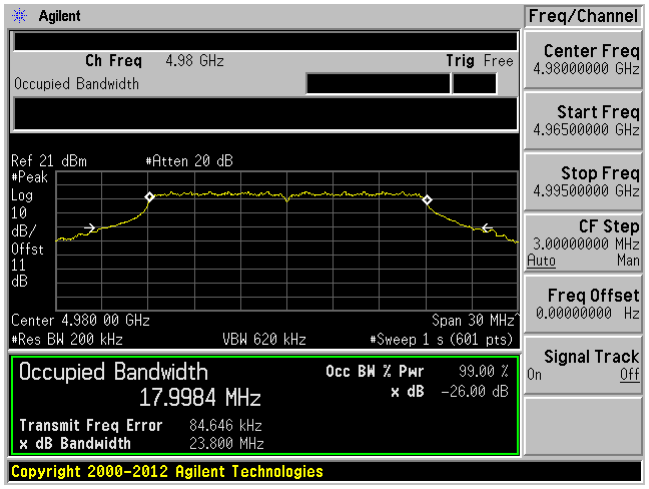
4950 MHz



4965 MHz

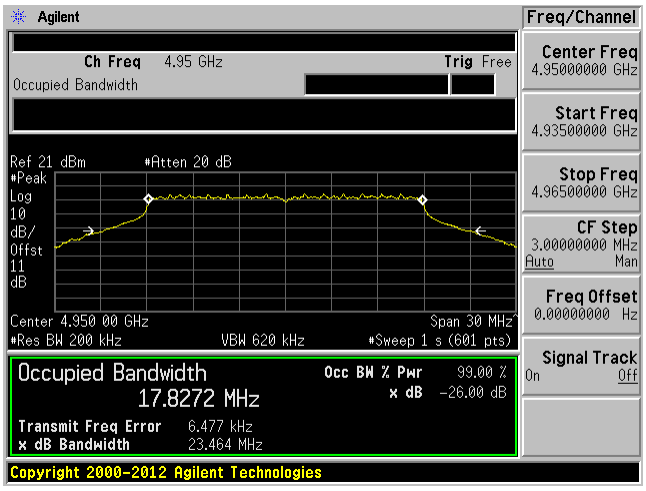


4980 MHz

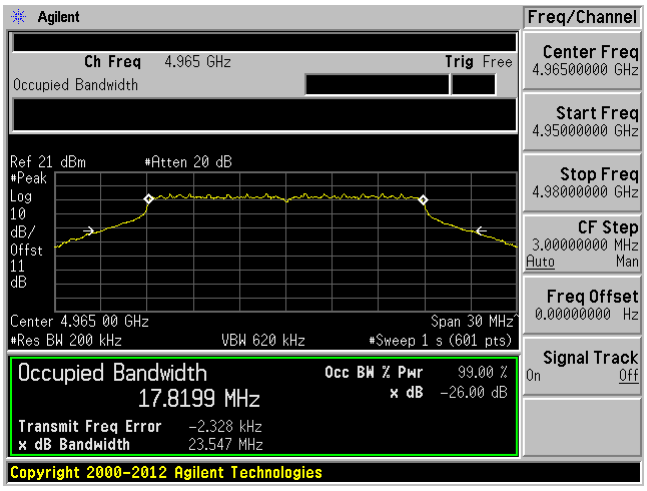


Antennna Port 2

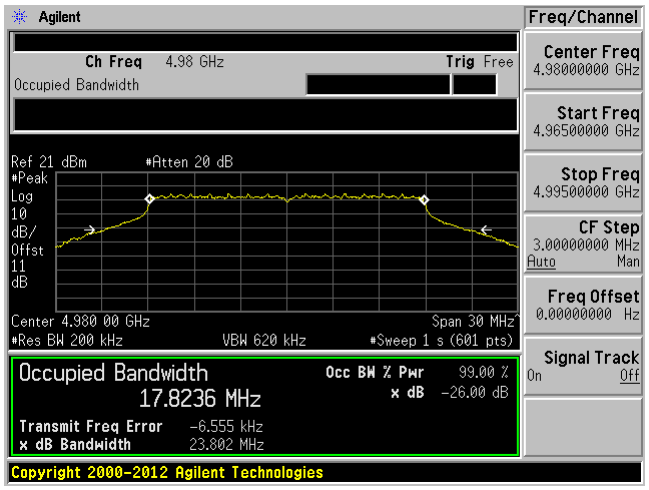
4950 MHz



4965 MHz



4980 MHz

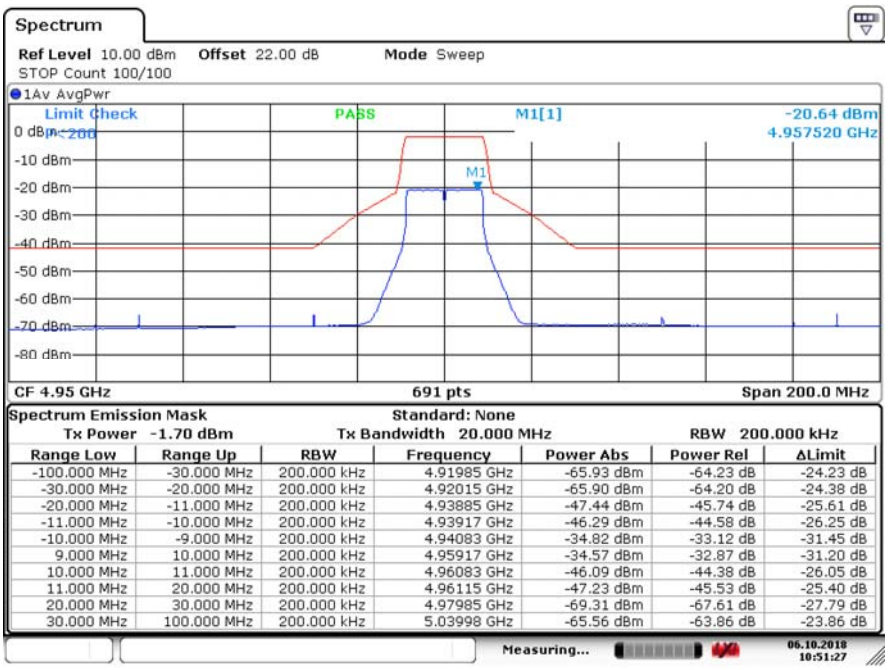


Emission Mask L

Dish Antenna

Antennna Port 1

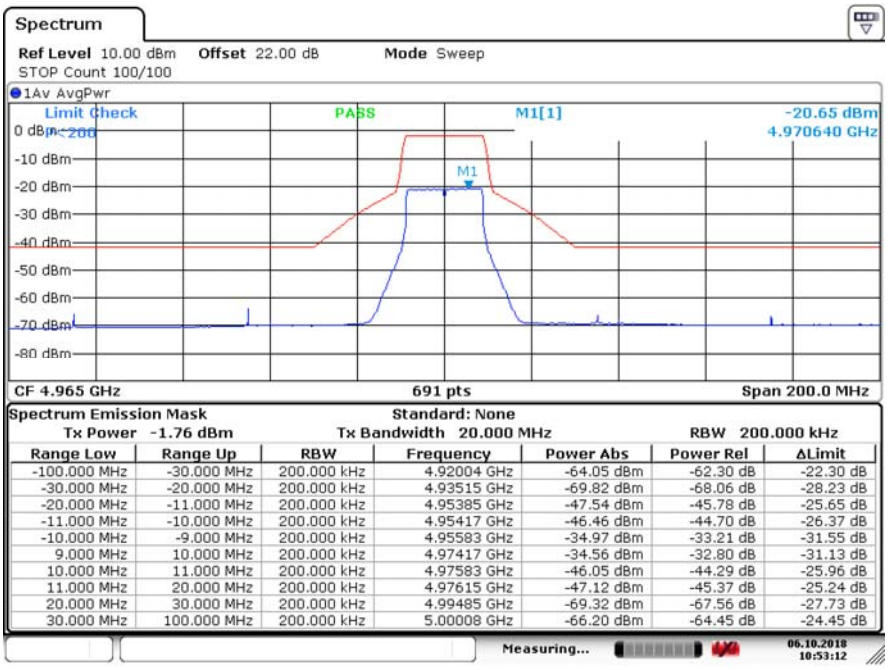
4950 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-100.000 MHz	-30.000 MHz	200.000 kHz	4.91985 GHz	-65.93 dBm	-64.23 dB	-24.23 dB
-30.000 MHz	-20.000 MHz	200.000 kHz	4.92015 GHz	-65.90 dBm	-64.20 dB	-24.38 dB
-20.000 MHz	-11.000 MHz	200.000 kHz	4.93885 GHz	-47.44 dBm	-45.74 dB	-25.61 dB
-11.000 MHz	-10.000 MHz	200.000 kHz	4.93917 GHz	-46.29 dBm	-44.58 dB	-26.25 dB
-10.000 MHz	-9.000 MHz	200.000 kHz	4.94083 GHz	-34.82 dBm	-33.12 dB	-31.45 dB
9.000 MHz	10.000 MHz	200.000 kHz	4.95917 GHz	-34.57 dBm	-32.87 dB	-31.20 dB
10.000 MHz	11.000 MHz	200.000 kHz	4.96083 GHz	-46.09 dBm	-44.38 dB	-26.05 dB
11.000 MHz	20.000 MHz	200.000 kHz	4.96115 GHz	-47.23 dBm	-45.53 dB	-25.40 dB
20.000 MHz	30.000 MHz	200.000 kHz	4.97985 GHz	-69.31 dBm	-67.61 dB	-27.79 dB
30.000 MHz	100.000 MHz	200.000 kHz	5.03998 GHz	-65.56 dBm	-63.86 dB	-23.86 dB

Date: 6.OCT.2018 10:51:27

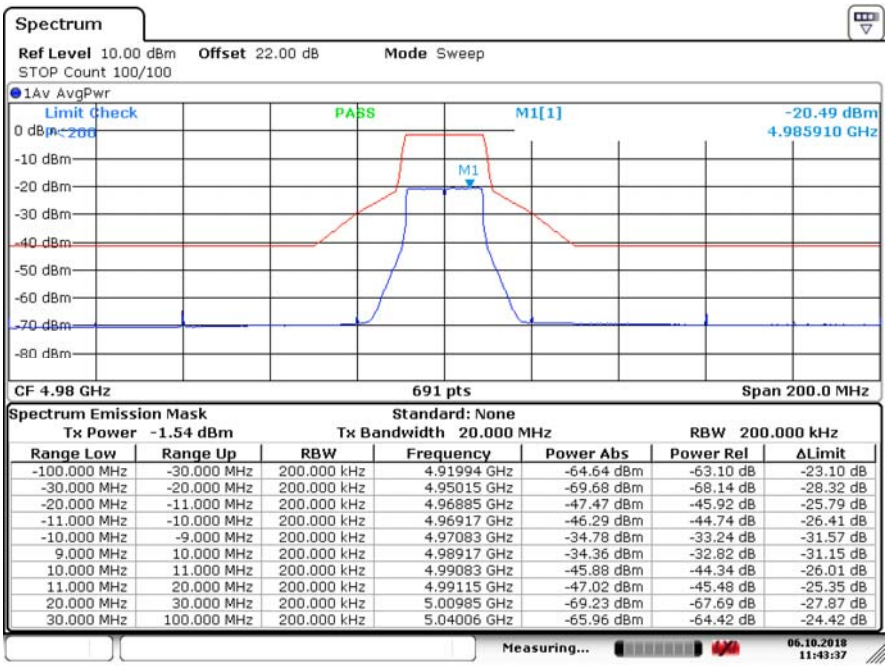
4965 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-100.000 MHz	-30.000 MHz	200.000 kHz	4.92004 GHz	-64.05 dBm	-62.30 dB	-22.30 dB
-30.000 MHz	-20.000 MHz	200.000 kHz	4.93515 GHz	-69.82 dBm	-68.06 dB	-28.23 dB
-20.000 MHz	-11.000 MHz	200.000 kHz	4.95385 GHz	-47.54 dBm	-45.78 dB	-25.65 dB
-11.000 MHz	-10.000 MHz	200.000 kHz	4.95417 GHz	-46.46 dBm	-44.70 dB	-26.37 dB
-10.000 MHz	-9.000 MHz	200.000 kHz	4.95583 GHz	-34.97 dBm	-33.21 dB	-31.55 dB
9.000 MHz	10.000 MHz	200.000 kHz	4.97417 GHz	-34.56 dBm	-32.80 dB	-31.13 dB
10.000 MHz	11.000 MHz	200.000 kHz	4.97583 GHz	-46.05 dBm	-44.29 dB	-25.96 dB
11.000 MHz	20.000 MHz	200.000 kHz	4.97615 GHz	-47.12 dBm	-45.37 dB	-25.24 dB
20.000 MHz	30.000 MHz	200.000 kHz	4.99485 GHz	-69.32 dBm	-67.56 dB	-27.73 dB
30.000 MHz	100.000 MHz	200.000 kHz	5.00008 GHz	-66.20 dBm	-64.45 dB	-24.45 dB

Date: 6.OCT.2018 10:53:13

4980 MHz



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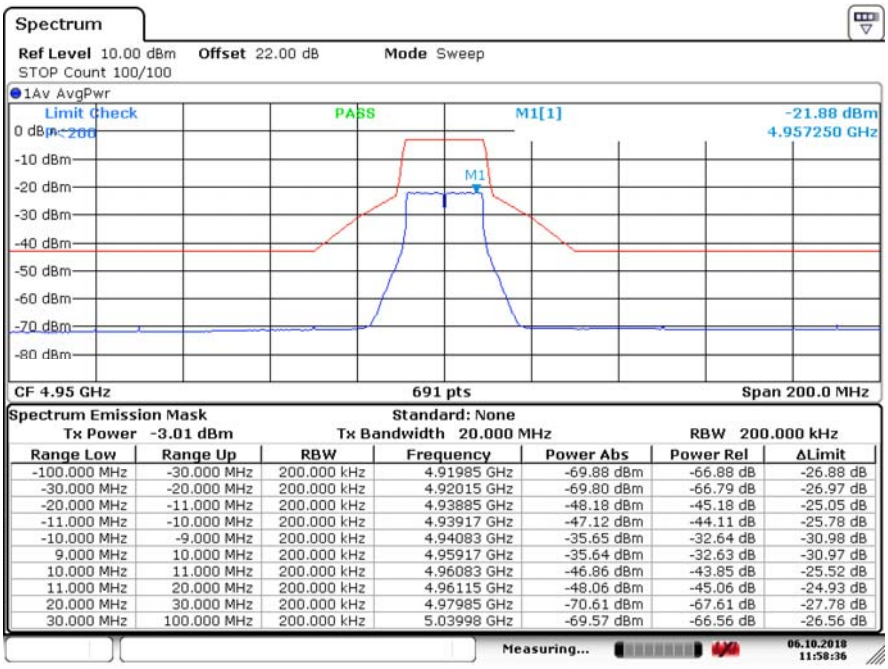
Antennna Port 2

4950 MHz



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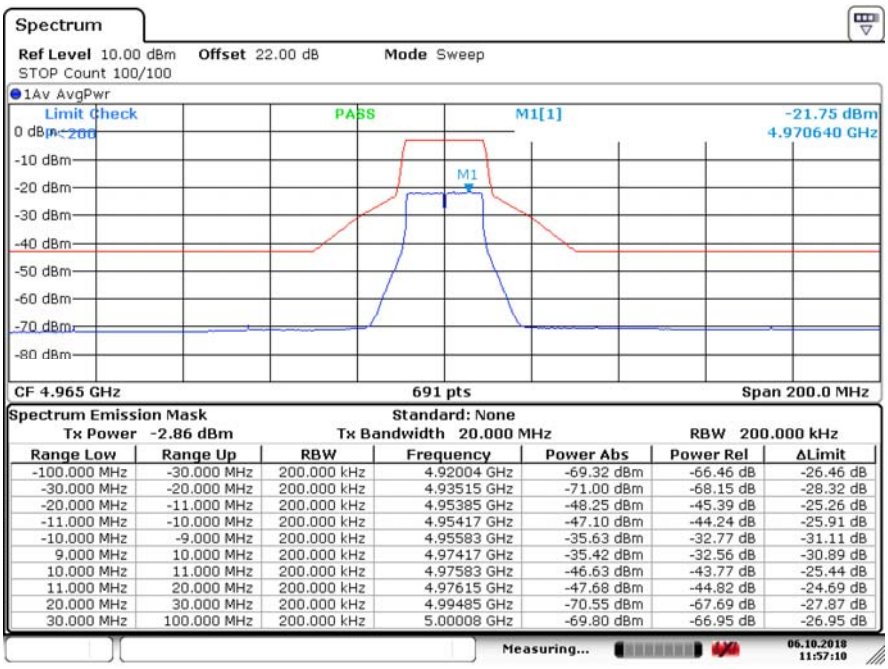
4965 MHz



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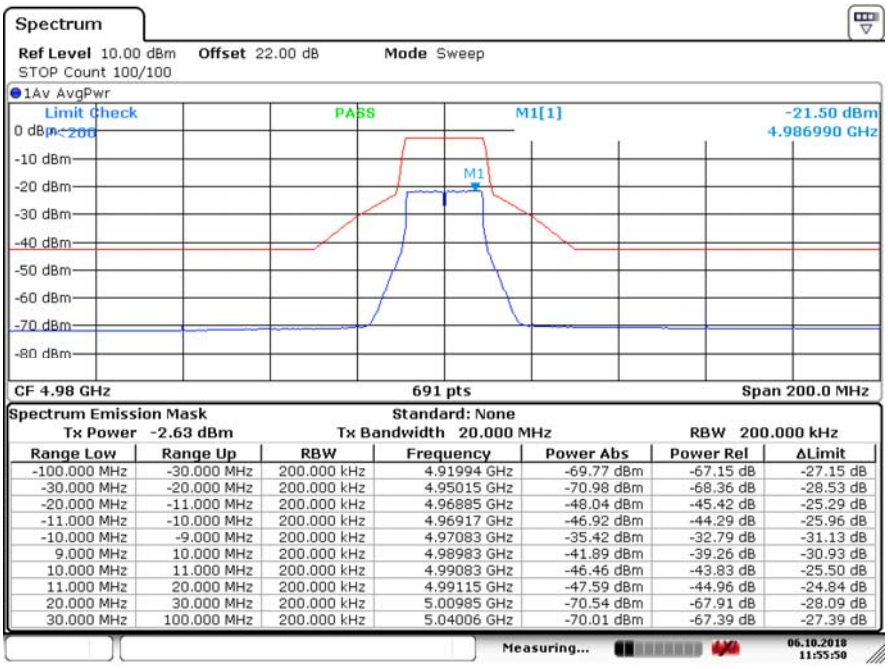
4980 MHz



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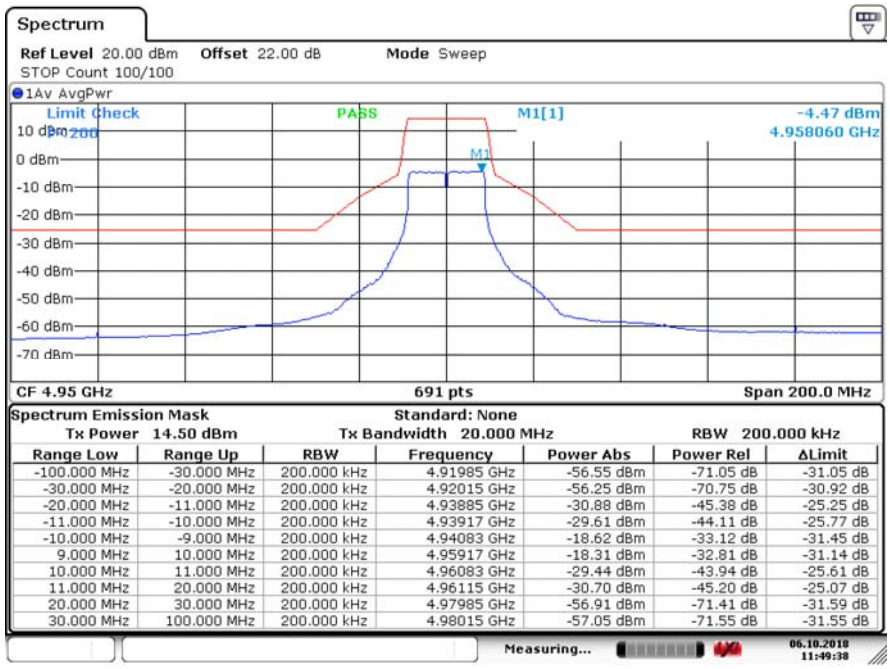
Internal Antenna

Antennna Port 1

4950 MHz



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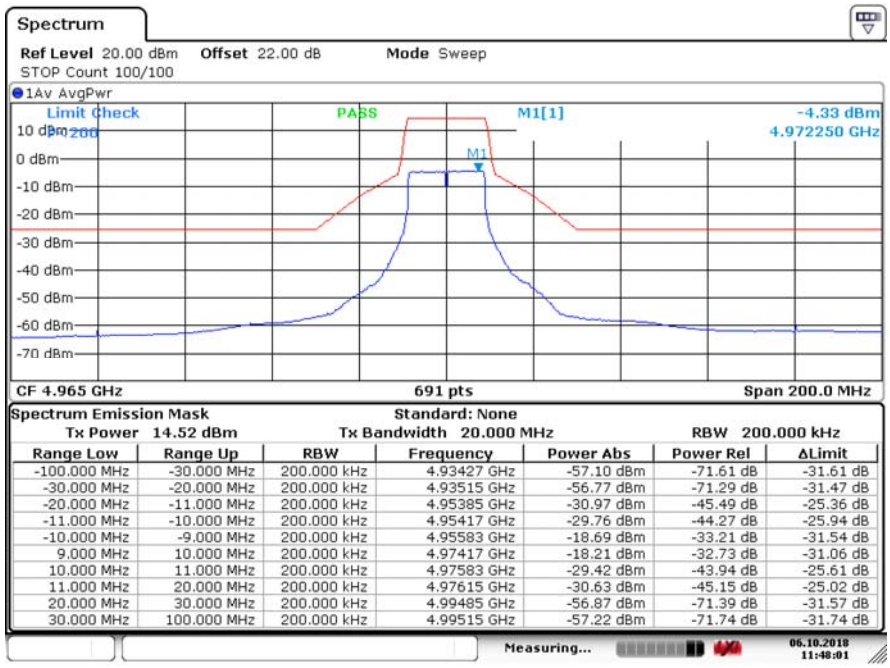
4965 MHz



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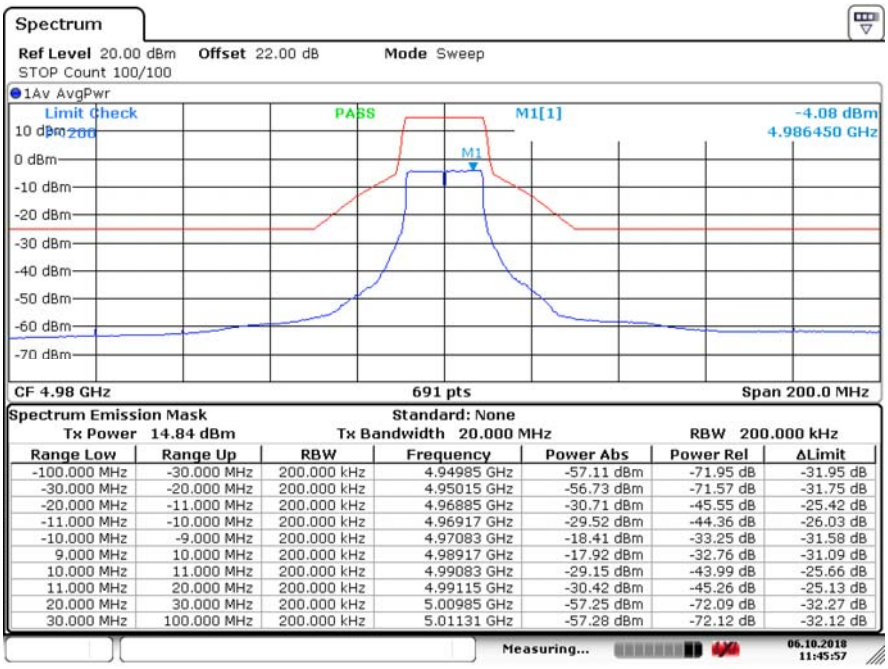
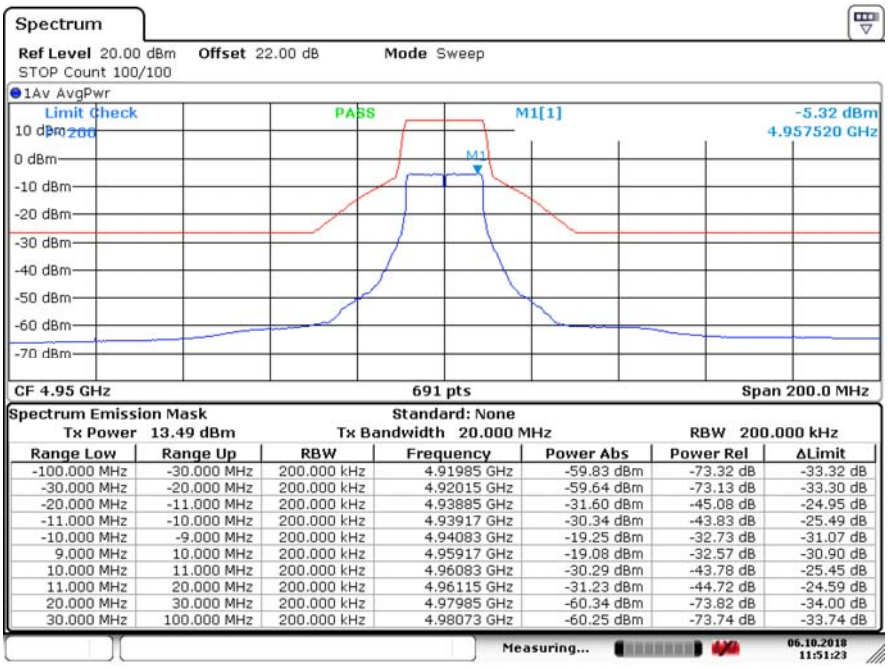
4980 MHz



Date: 6.OCT.2018 11:45:57

Antennna Port 2

4950 MHz



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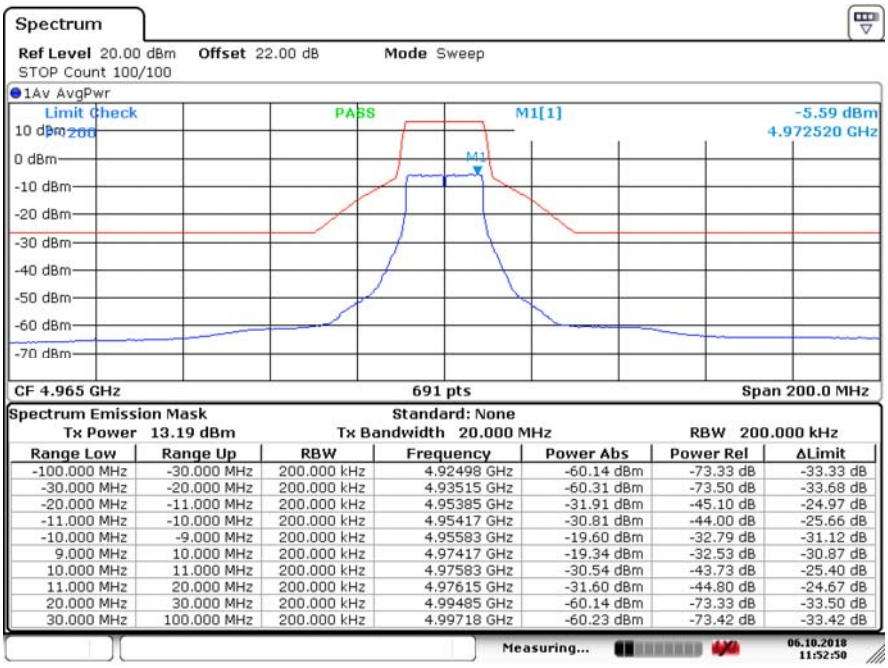
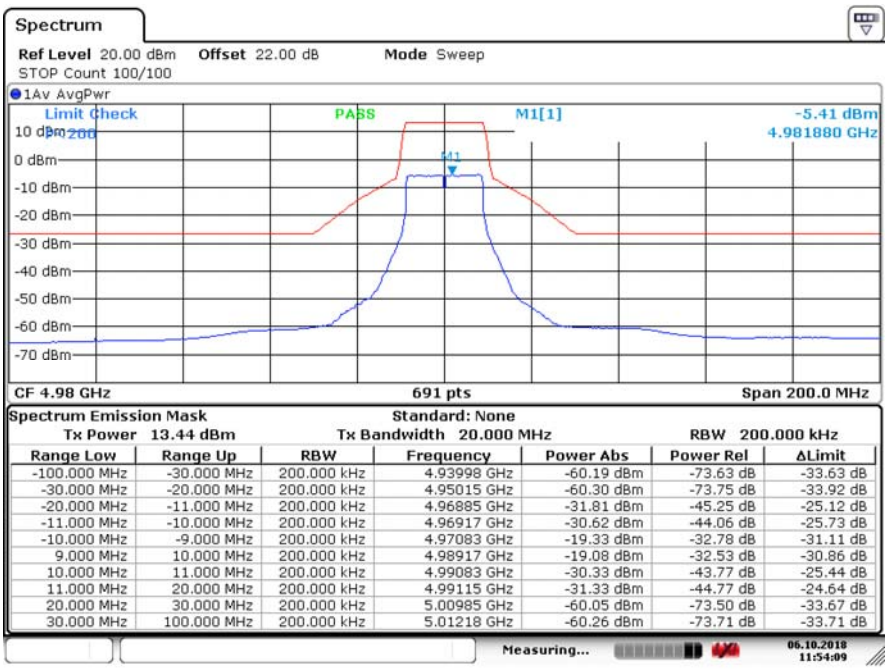
4965 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-100.000 MHz	-30.000 MHz	200.000 kHz	4.92498 GHz	-60.14 dBm	-73.33 dB	-33.33 dB
-30.000 MHz	-20.000 MHz	200.000 kHz	4.93515 GHz	-60.31 dBm	-73.50 dB	-33.68 dB
-20.000 MHz	-11.000 MHz	200.000 kHz	4.95385 GHz	-31.91 dBm	-45.10 dB	-24.97 dB
-11.000 MHz	-10.000 MHz	200.000 kHz	4.95417 GHz	-30.81 dBm	-44.00 dB	-25.66 dB
-10.000 MHz	-9.000 MHz	200.000 kHz	4.95583 GHz	-19.60 dBm	-32.79 dB	-31.12 dB
9.000 MHz	10.000 MHz	200.000 kHz	4.97417 GHz	-19.34 dBm	-32.53 dB	-30.87 dB
10.000 MHz	11.000 MHz	200.000 kHz	4.97583 GHz	-30.54 dBm	-43.73 dB	-25.40 dB
11.000 MHz	20.000 MHz	200.000 kHz	4.97615 GHz	-31.60 dBm	-44.80 dB	-24.67 dB
20.000 MHz	30.000 MHz	200.000 kHz	4.99485 GHz	-60.14 dBm	-73.33 dB	-33.50 dB
30.000 MHz	100.000 MHz	200.000 kHz	4.99718 GHz	-60.23 dBm	-73.42 dB	-33.42 dB

Date: 6.OCT.2018 11:52:50

4980 MHz



Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-100.000 MHz	-30.000 MHz	200.000 kHz	4.93998 GHz	-60.19 dBm	-73.63 dB	-33.63 dB
-30.000 MHz	-20.000 MHz	200.000 kHz	4.95015 GHz	-60.30 dBm	-73.75 dB	-33.92 dB
-20.000 MHz	-11.000 MHz	200.000 kHz	4.96885 GHz	-31.81 dBm	-45.25 dB	-25.12 dB
-11.000 MHz	-10.000 MHz	200.000 kHz	4.96917 GHz	-30.62 dBm	-44.06 dB	-25.73 dB
-10.000 MHz	-9.000 MHz	200.000 kHz	4.97083 GHz	-19.33 dBm	-32.78 dB	-31.11 dB
9.000 MHz	10.000 MHz	200.000 kHz	4.98917 GHz	-19.08 dBm	-32.53 dB	-30.86 dB
10.000 MHz	11.000 MHz	200.000 kHz	4.99083 GHz	-30.33 dBm	-43.77 dB	-25.44 dB
11.000 MHz	20.000 MHz	200.000 kHz	4.99115 GHz	-31.33 dBm	-44.77 dB	-24.64 dB
20.000 MHz	30.000 MHz	200.000 kHz	5.00985 GHz	-60.05 dBm	-73.50 dB	-33.67 dB
30.000 MHz	100.000 MHz	200.000 kHz	5.01218 GHz	-60.26 dBm	-73.71 dB	-33.71 dB

Date: 6.OCT.2018 11:54:08

8 FCC §90.1215 (e) & ISEDC RSS-111 §5.4 - Peak Excursion

8.1 Applicable Standard

According to FCC §90.1215, (e) The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

According to ISEDC RSS-111 Section 5.4 Transmitter Peak to Average Power Ratio (PAPR)

The PAPR of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission.

8.2 Test Procedure

Please refer to ANSI C63.26-2015 Section 5.2.6.

8.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rhode & Schwarz	Signal Analyzer	FSV40	1321.3008K39 -101203-UW	2018-07-23	1 year
-	RF cable	-	-	Each time[1]	N/A
-	20dB attenuator	-	-	Each time[1]	N/A

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

8.4 Test Environmental Conditions

Temperature:	20-25 °C
Relative Humidity:	44-55 %
ATM Pressure:	101-102 kPa

The testing was performed by Harry Zhao on 2018-10-11 in the RF Site.

8.5 Test Results

Dish Antenna – Antenna Gain 25 dBi

Frequency (MHz)	Ant 1 (dB)	Ant 2 (dB)	Limit (dB)
4950	-8.63	-9.76	13
4965	-8.03	-9.87	13
4980	-8.49	-9.79	13

Internal Antenna – Antenna Gain 8 dBi

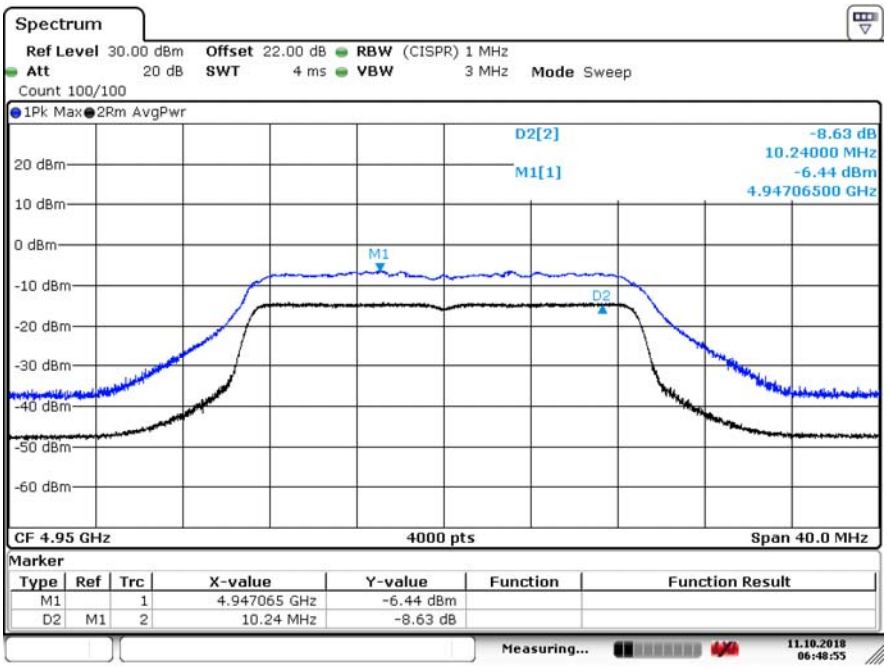
Frequency (MHz)	Ant 1 (dB)	Ant 2 (dB)	Limit (dB)
4950	-8.16	-9.68	13
4965	-8.43	-9.76	13
4980	-7.61	-9.40	13

Please refer to the following plots.

Dish Antenna

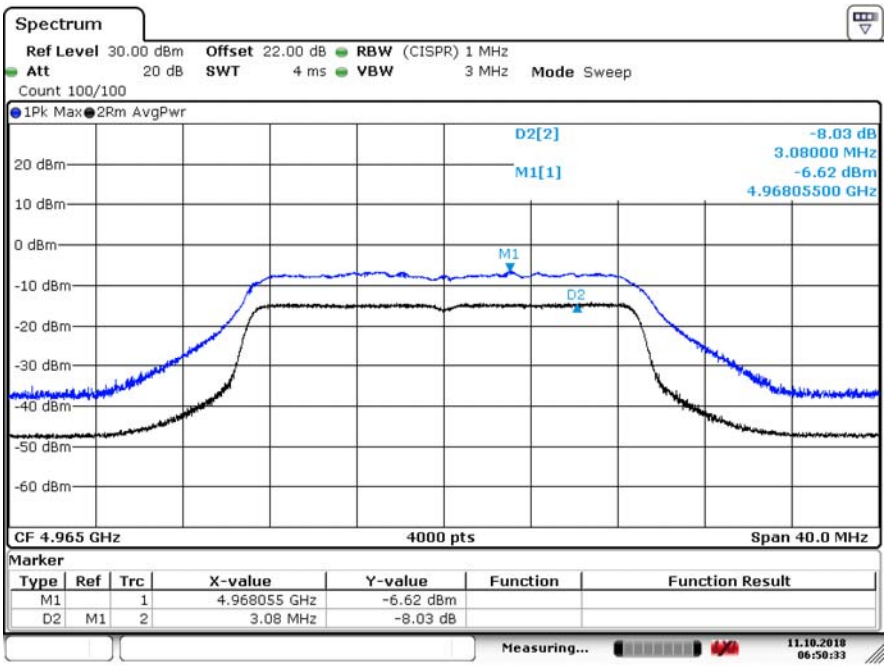
Antennna Port 1

4950 MHz



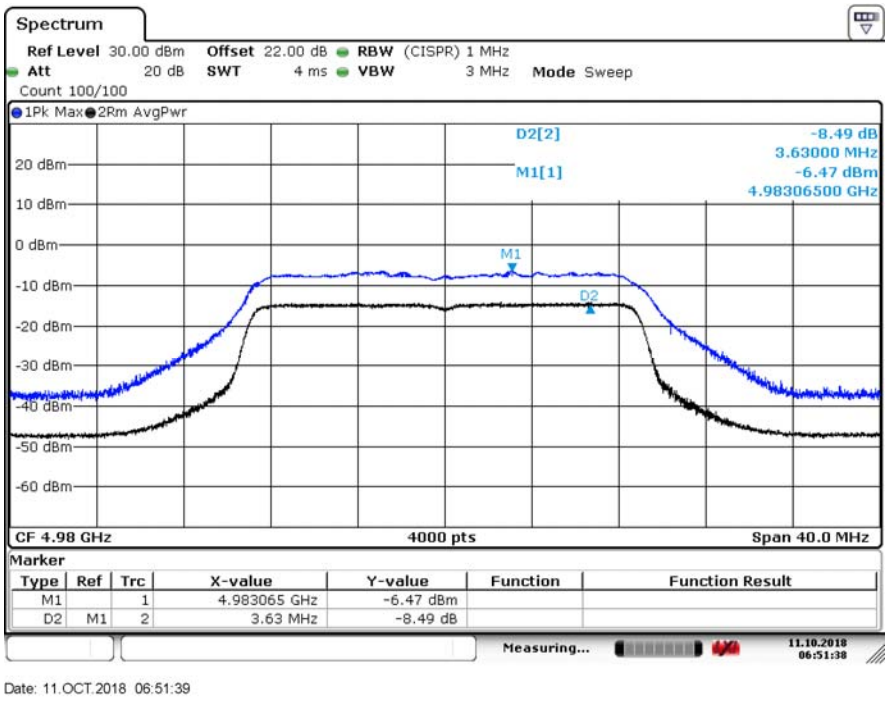
Date: 11.OCT.2018 06:48:55

4965 MHz



Date: 11.OCT.2018 06:50:34

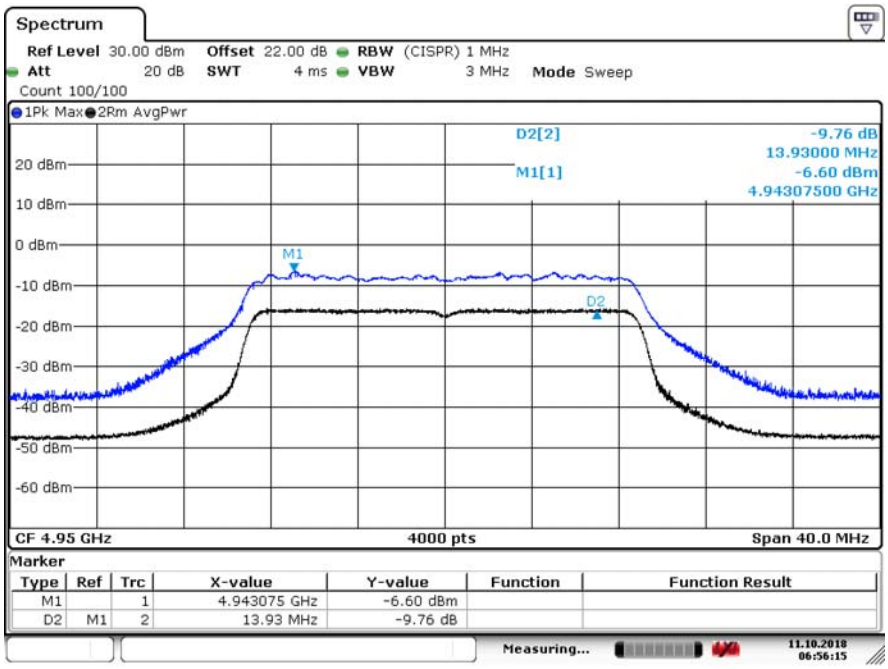
4980 MHz



Date: 11.OCT.2018 06:51:39

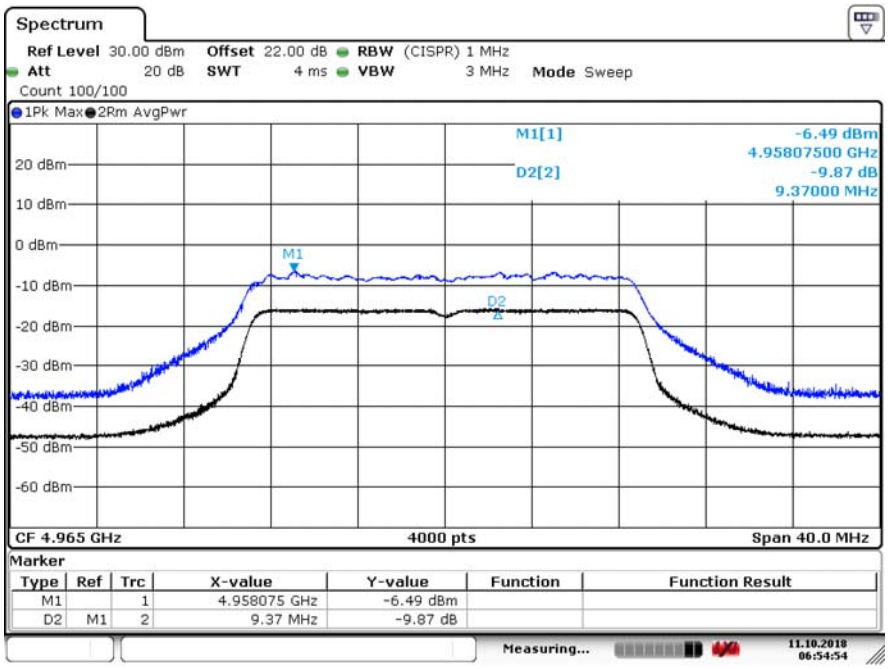
Antennna Port 2

4950 MHz



Date: 11.OCT.2018 06:56:15

4965 MHz



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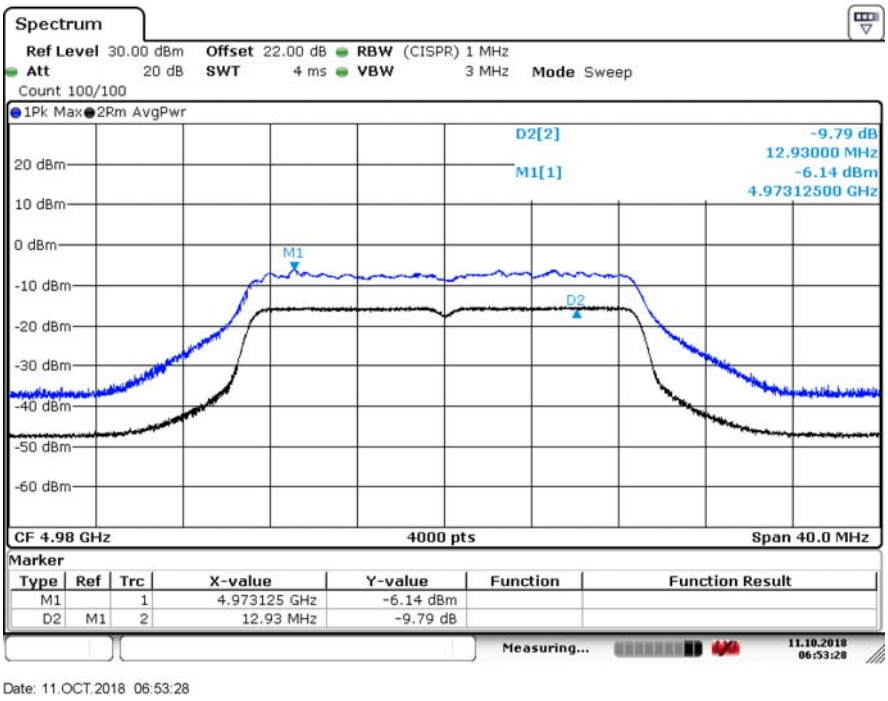
4980 MHz

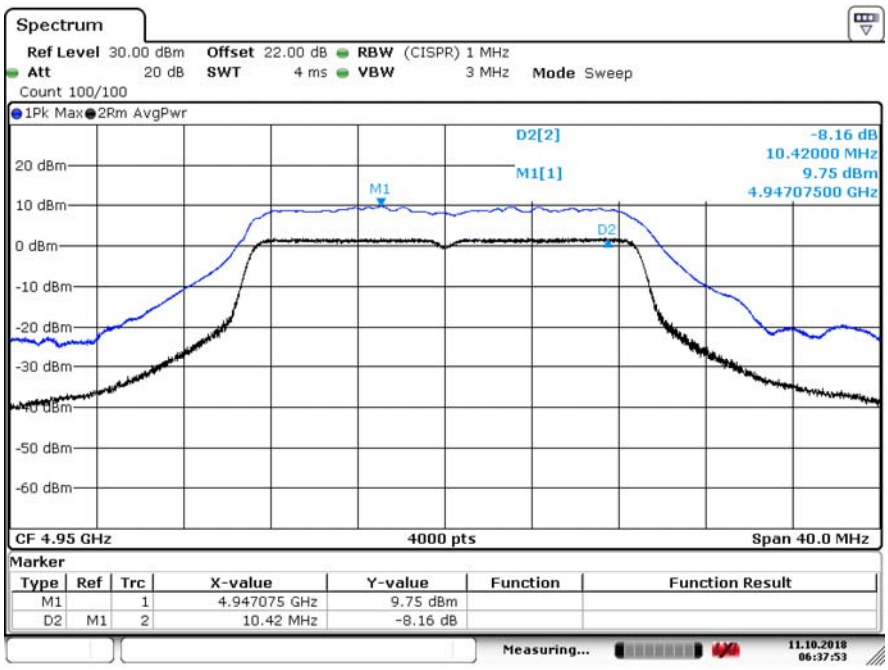


Date: 11.OCT.2018 06:53:28

Internal Antenna

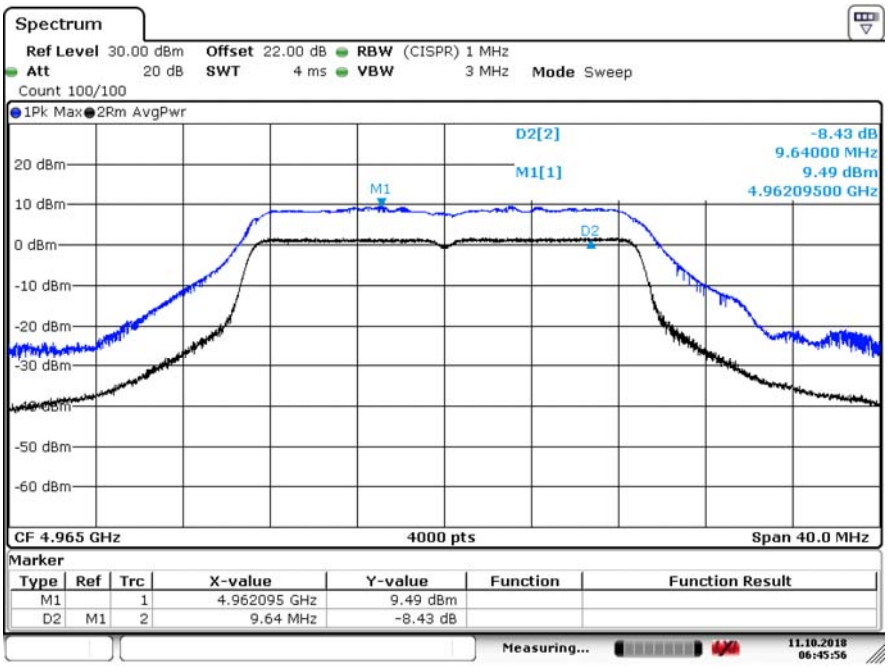
Antennna Port 1

4950 MHz



Date: 11.OCT.2018 06:37:53

4965 MHz



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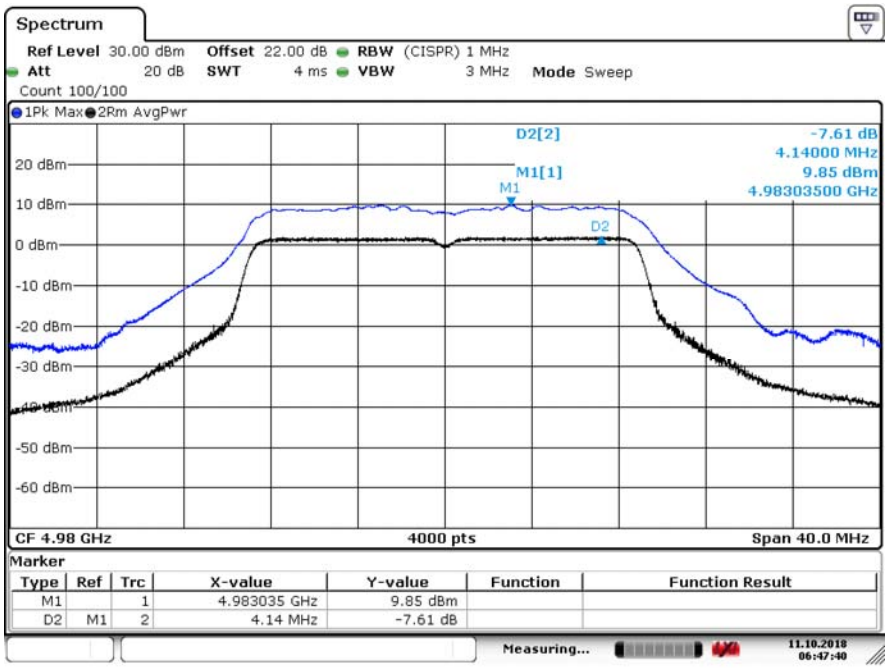
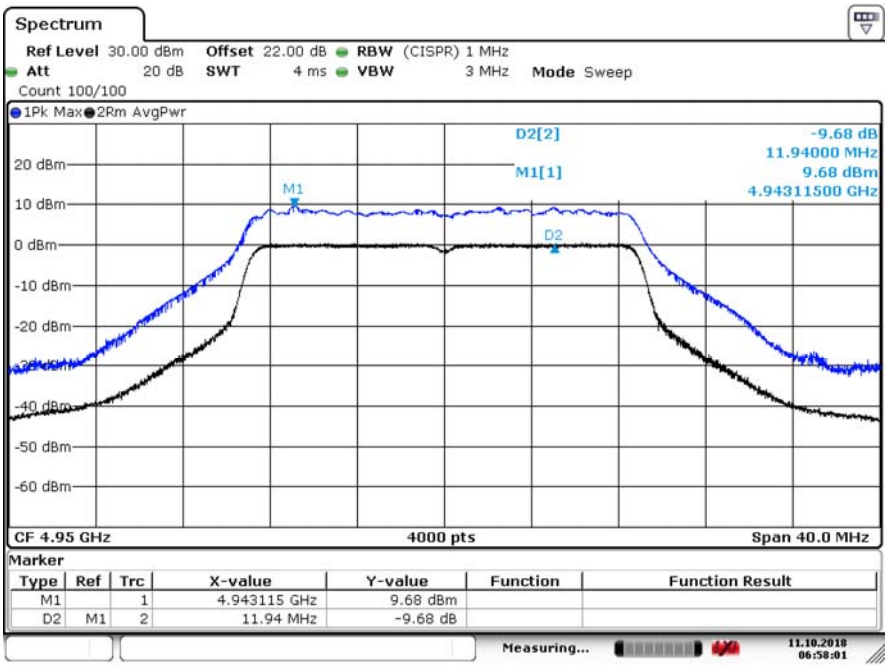
4980 MHz



Date: 11.OCT.2018 06:47:41

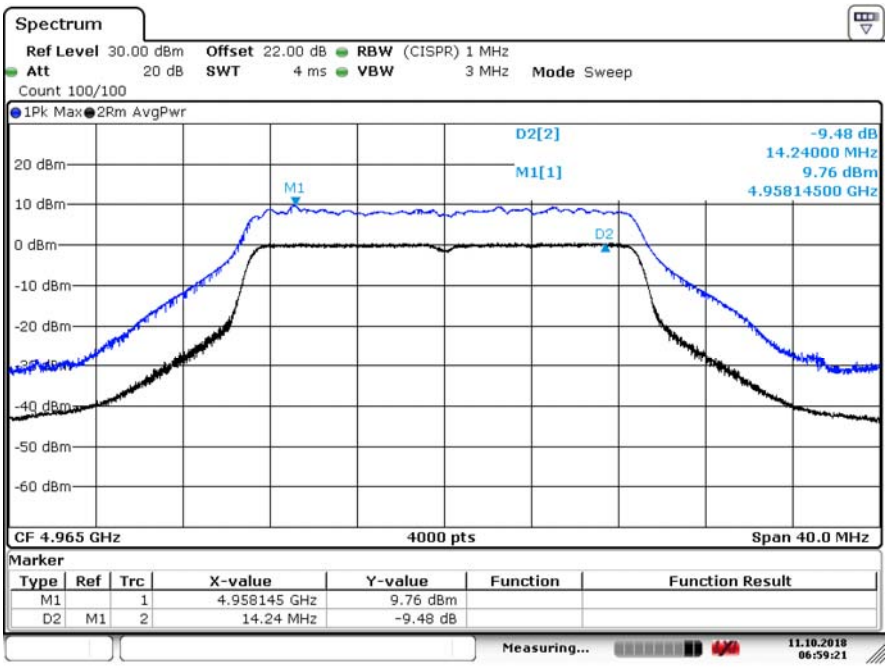
Antennna Port 2

4950 MHz



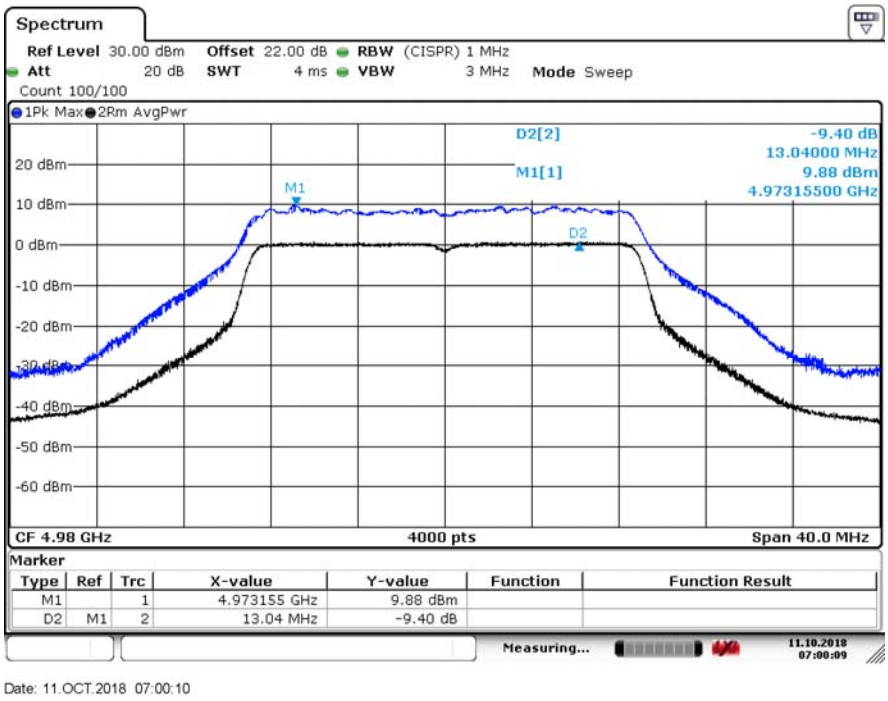
Date: 11.OCT.2018 06:58:01

4965 MHz



Date: 11.OCT.2018 06:59:21

4980 MHz



Date: 11.OCT.2018 07:00:10

9 FCC §2.1051, §90.210 & ISEDC RSS-111 §5.5 - Spurious Emissions at Antenna Terminals

9.1 Applicable Standard

FCC §90.210

(l) Emission Mask L. For low power transmitters (20 dBm or less) operating in the 4940-4990 MHz frequency band, the power spectral density of the emissions must be attenuated below the output power of the transmitter as follows:

(1) On any frequency removed from the assigned frequency between 0-45% of the authorized bandwidth (BW): 0 dB.

(2) On any frequency removed from the assigned frequency between 45-50% of the authorized bandwidth: 219 log (% of (BW)/45) dB.

(3) On any frequency removed from the assigned frequency between 50-55% of the authorized bandwidth: 10 + 242 log (% of (BW)/50) dB.

(4) On any frequency removed from the assigned frequency between 55-100% of the authorized bandwidth: 20 + 31 log (% of (BW)/55) dB attenuation.

(5) On any frequency removed from the assigned frequency between 100-150% of the authorized bandwidth: 28 + 68 log (% of (BW)/100) dB attenuation.

(6) On any frequency removed from the assigned frequency above 150% of the authorized bandwidth: 40 dB.

(7) The zero dB reference is measured relative to the highest average power of the fundamental emission measured across the designated channel bandwidth using a resolution bandwidth of at least one percent of the occupied bandwidth of the fundamental emission and a video bandwidth of 30 kHz. The power spectral density is the power measured within the resolution bandwidth of the measurement device divided by the resolution bandwidth of the measurement device. Emission levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least one percent of the occupied bandwidth.

ISEDC RSS-111,

5.5 Transmitter Unwanted Emissions
Transmitter unwanted emissions shall be measured according to the method described in Section 4.3.

On any frequency f, offset from the channel centre frequency fc by a separation fd (expressed as a percentage of the channel bandwidth), the power spectral density of the unwanted emissions for low- and high-power transmitters shall comply with the limits specified below in Table 2. Figure 1 shows the emission mask for low- and high-power transmitters. For equipment with multiple transmitters, the unwanted emissions of each transmitter shall comply with the emission limits based on the output power of the transmitter regardless of the total output power of the equipment (i.e. total output power from all the transmitters).

Table 2 — Emission Mask for Low- and High-power Transmitters		
Offset Frequency f_d (% of the Equipment's Channel Bandwidth)	**Minimum Attenuation (dB)**	
	Low-power Transmitter	**High-power Transmitter**
$0 < f_d \leq 45$	0	0
$45 < f_d \leq 50$	219 log (f_d/45)	568 log (f_d/45)
$50 < f_d \leq 55$	10 + 242 log (f_d/50)	26 + 145 log (f_d/50)
$55 < f_d \leq 100$	20 + 31 log (f_d/55)	32 + 31 log (f_d/55)
$100 < f_d \leq 150$	28 + 68 log (f_d/100)	40 + 57 log (f_d/100)
$f_d > 150$	40	whichever is less stringent 50 or 55 + 10 log p
Where: f_d (%) = ((f-f_c)/channel bandwidth) x 100 p: transmitter's output power (in watts), measured as per Section 4.1		

9.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 200 kHz for emissions below 1 GHz and 200 kHz for emissions above 1 GHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

9.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rhode & Schwarz	Spectrum Analyzer	FSV40	1321.3008K39-101203-UW	2018-07-23	1 Year
-	RF cable	-	-	Each time[1]	N/A
-	20dB attenuator	-	-	Each time[1]	N/A

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

9.4 Test Environmental Conditions

Temperature:	20-25 °C
Relative Humidity:	44-55 %
ATM Pressure:	101-102 kPa

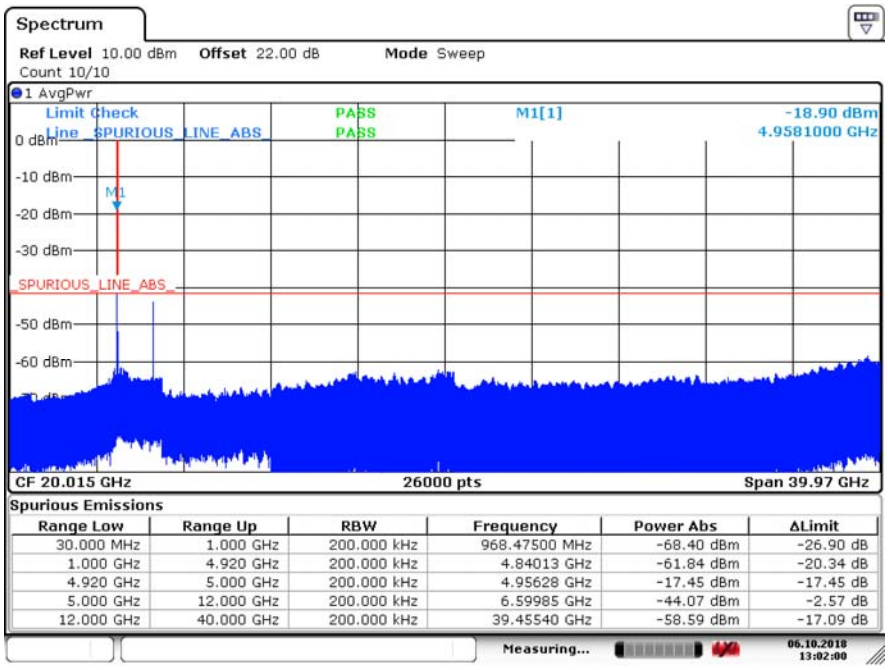
The testing was performed by Harry Zhao on 2018-10-06 in the RF Site.

9.5 Test Results

Dish Antenna

Antennna Port 1

4950 MHz

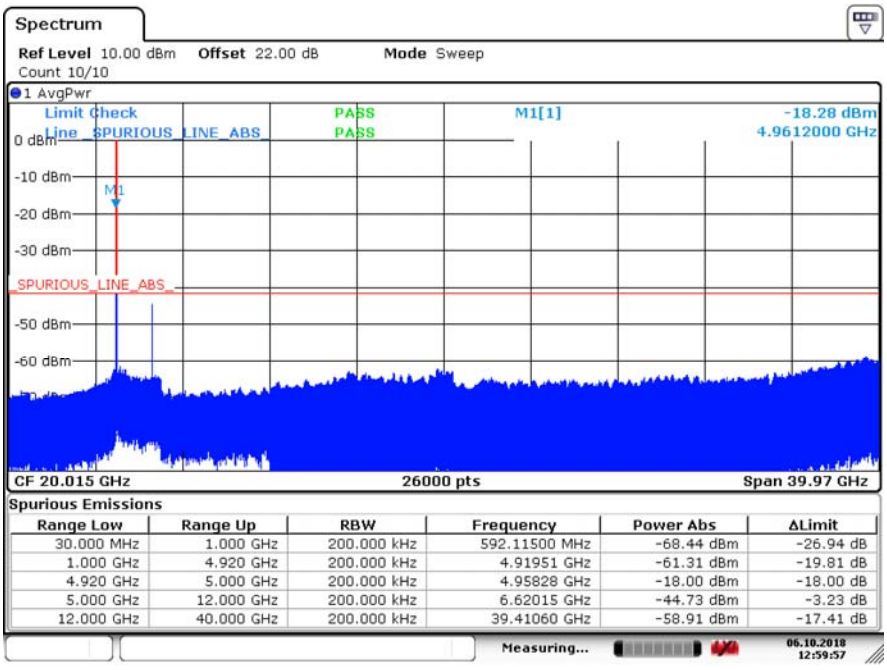


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	200.000 kHz	968.47500 MHz	-68.40 dBm	-26.90 dB
1.000 GHz	4.920 GHz	200.000 kHz	4.84013 GHz	-61.84 dBm	-20.34 dB
4.920 GHz	5.000 GHz	200.000 kHz	4.95628 GHz	-17.45 dBm	-17.45 dB
5.000 GHz	12.000 GHz	200.000 kHz	6.59985 GHz	-44.07 dBm	-2.57 dB
12.000 GHz	40.000 GHz	200.000 kHz	39.45540 GHz	-58.59 dBm	-17.09 dB

Date: 6.OCT.2018 13:02:01

4965 MHz

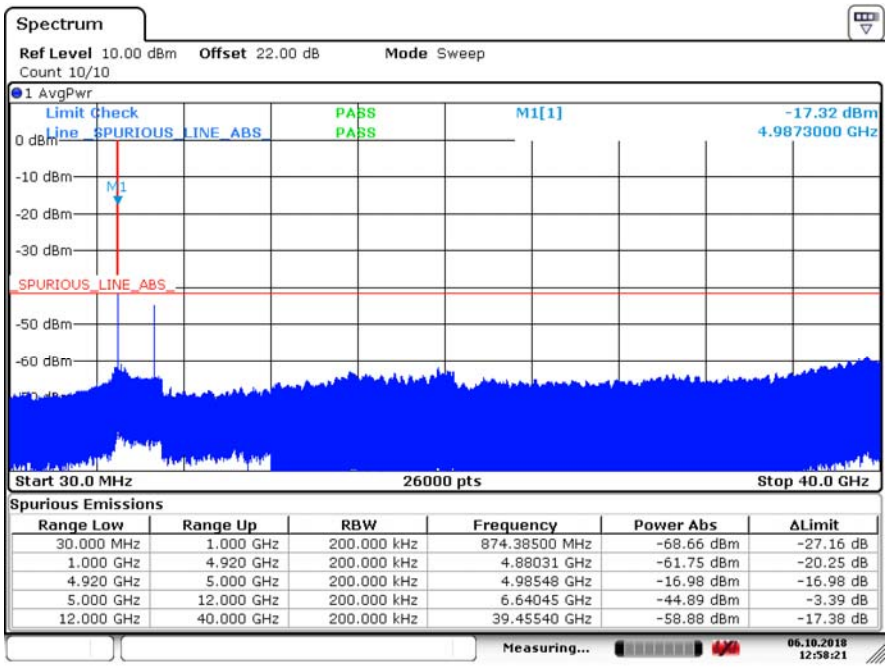


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	200.000 kHz	592.11500 MHz	-68.44 dBm	-26.94 dB
1.000 GHz	4.920 GHz	200.000 kHz	4.91951 GHz	-61.31 dBm	-19.81 dB
4.920 GHz	5.000 GHz	200.000 kHz	4.95828 GHz	-18.00 dBm	-18.00 dB
5.000 GHz	12.000 GHz	200.000 kHz	6.62015 GHz	-44.73 dBm	-3.23 dB
12.000 GHz	40.000 GHz	200.000 kHz	39.41060 GHz	-58.91 dBm	-17.41 dB

Date: 6.OCT.2018 12:59:58

4980 MHz



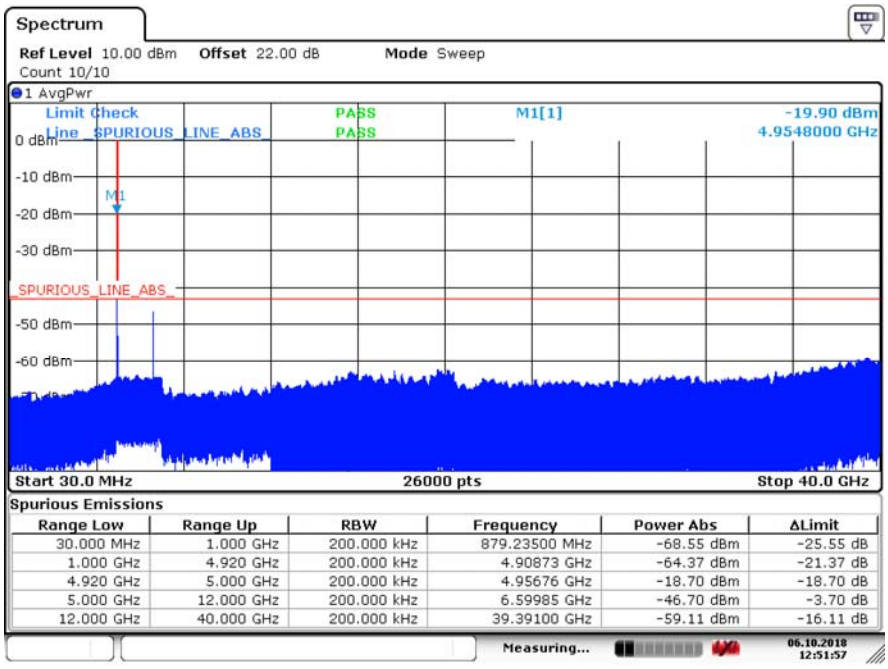
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	200.000 kHz	874.38500 MHz	-68.66 dBm	-27.16 dB
1.000 GHz	4.920 GHz	200.000 kHz	4.88031 GHz	-61.75 dBm	-20.25 dB
4.920 GHz	5.000 GHz	200.000 kHz	4.98548 GHz	-16.98 dBm	-16.98 dB
5.000 GHz	12.000 GHz	200.000 kHz	6.64045 GHz	-44.89 dBm	-3.39 dB
12.000 GHz	40.000 GHz	200.000 kHz	39.45540 GHz	-58.88 dBm	-17.38 dB

Date: 6.OCT.2018 12:58:21

Antennna Port 2

4950 MHz

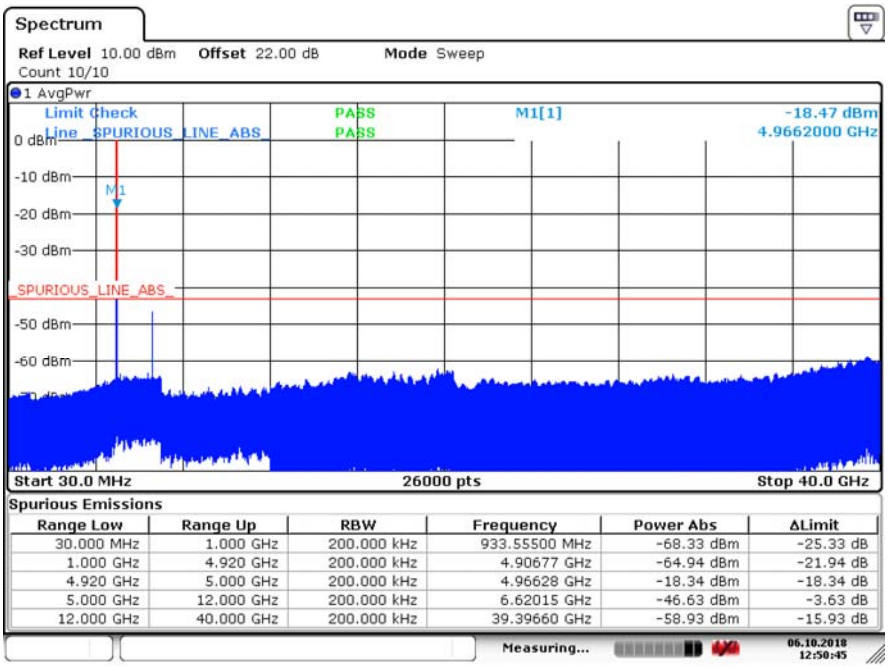


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	200.000 kHz	879.23500 MHz	-68.55 dBm	-25.55 dB
1.000 GHz	4.920 GHz	200.000 kHz	4.90873 GHz	-64.37 dBm	-21.37 dB
4.920 GHz	5.000 GHz	200.000 kHz	4.95676 GHz	-18.70 dBm	-18.70 dB
5.000 GHz	12.000 GHz	200.000 kHz	6.59985 GHz	-46.70 dBm	-3.70 dB
12.000 GHz	40.000 GHz	200.000 kHz	39.39100 GHz	-59.11 dBm	-16.11 dB

Date: 6.OCT.2018 12:51:57

4965 MHz

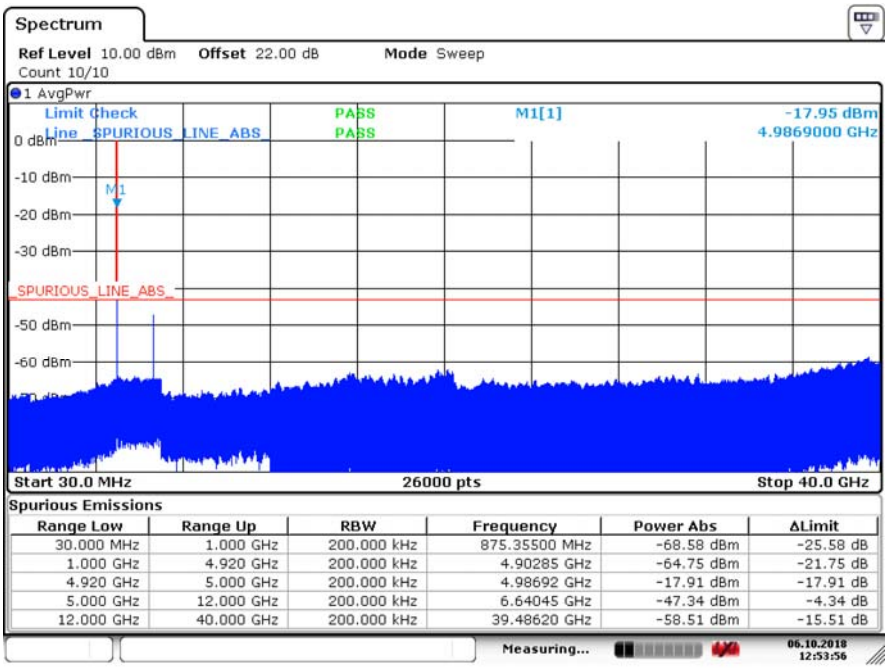


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	200.000 kHz	933.55500 MHz	-68.33 dBm	-25.33 dB
1.000 GHz	4.920 GHz	200.000 kHz	4.90677 GHz	-64.94 dBm	-21.94 dB
4.920 GHz	5.000 GHz	200.000 kHz	4.96628 GHz	-18.34 dBm	-18.34 dB
5.000 GHz	12.000 GHz	200.000 kHz	6.62015 GHz	-46.63 dBm	-3.63 dB
12.000 GHz	40.000 GHz	200.000 kHz	39.39660 GHz	-58.93 dBm	-15.93 dB

Date: 6.OCT.2018 12:50:45

4980 MHz



Spurious Emissions

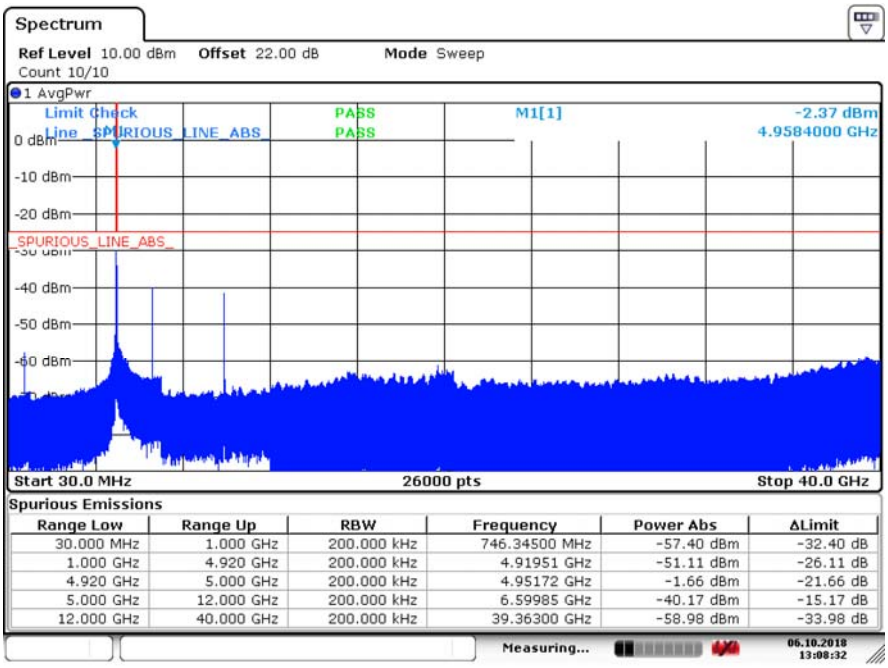
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	200.000 kHz	875.35500 MHz	-68.58 dBm	-25.58 dB
1.000 GHz	4.920 GHz	200.000 kHz	4.90285 GHz	-64.75 dBm	-21.75 dB
4.920 GHz	5.000 GHz	200.000 kHz	4.98692 GHz	-17.91 dBm	-17.91 dB
5.000 GHz	12.000 GHz	200.000 kHz	6.64045 GHz	-47.34 dBm	-4.34 dB
12.000 GHz	40.000 GHz	200.000 kHz	39.48620 GHz	-58.51 dBm	-15.51 dB

Date: 6.OCT.2018 12:53:57

Internal Antenna

Antennna Port 1

4950 MHz

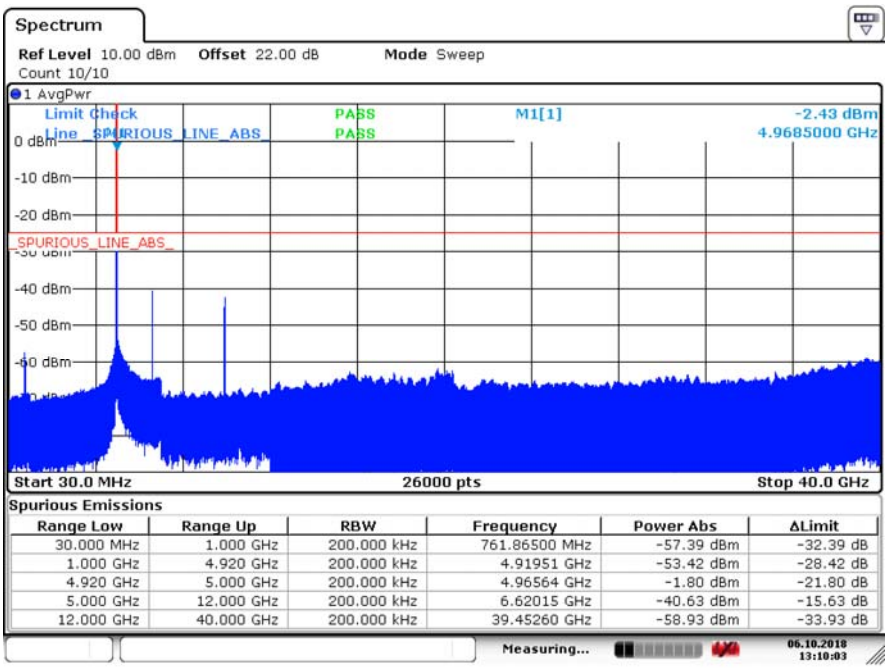


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	200.000 kHz	746.34500 MHz	-57.40 dBm	-32.40 dB
1.000 GHz	4.920 GHz	200.000 kHz	4.91951 GHz	-51.11 dBm	-26.11 dB
4.920 GHz	5.000 GHz	200.000 kHz	4.95172 GHz	-1.66 dBm	-21.66 dB
5.000 GHz	12.000 GHz	200.000 kHz	6.59985 GHz	-40.17 dBm	-15.17 dB
12.000 GHz	40.000 GHz	200.000 kHz	39.36300 GHz	-58.98 dBm	-33.98 dB

Date: 6.OCT.2018 13:08:33

4965 MHz

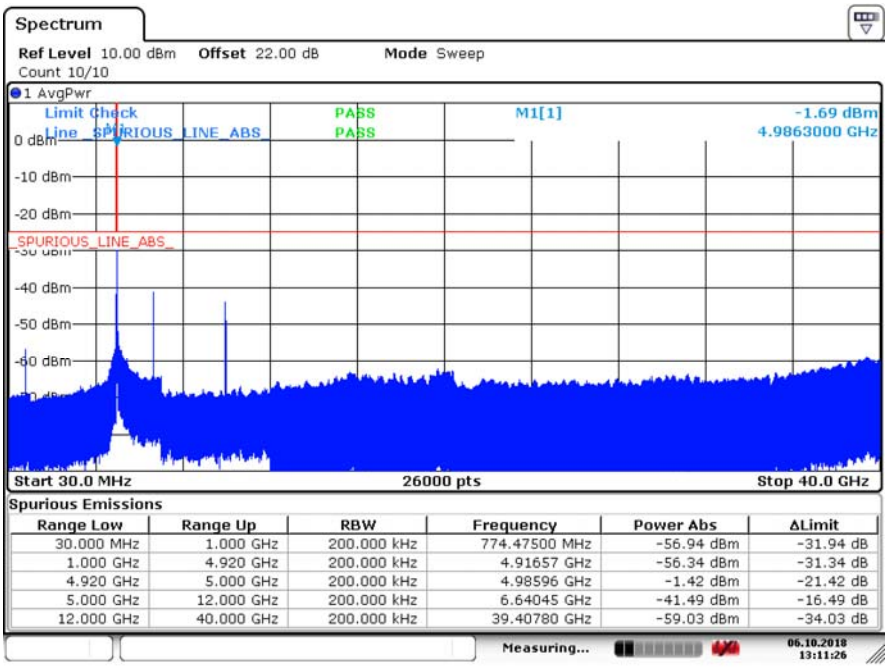


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	200.000 kHz	761.86500 MHz	-57.39 dBm	-32.39 dB
1.000 GHz	4.920 GHz	200.000 kHz	4.91951 GHz	-53.42 dBm	-28.42 dB
4.920 GHz	5.000 GHz	200.000 kHz	4.96564 GHz	-1.80 dBm	-21.80 dB
5.000 GHz	12.000 GHz	200.000 kHz	6.62015 GHz	-40.63 dBm	-15.63 dB
12.000 GHz	40.000 GHz	200.000 kHz	39.45260 GHz	-58.93 dBm	-33.93 dB

Date: 6.OCT.2018 13:10:03

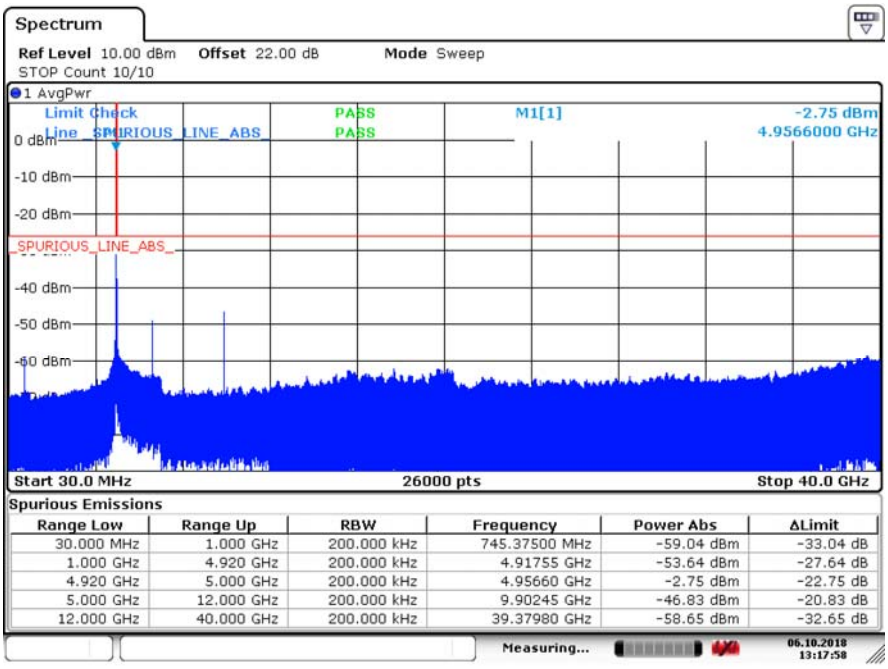
4980 MHz



Date: 6.OCT.2018 13:11:26

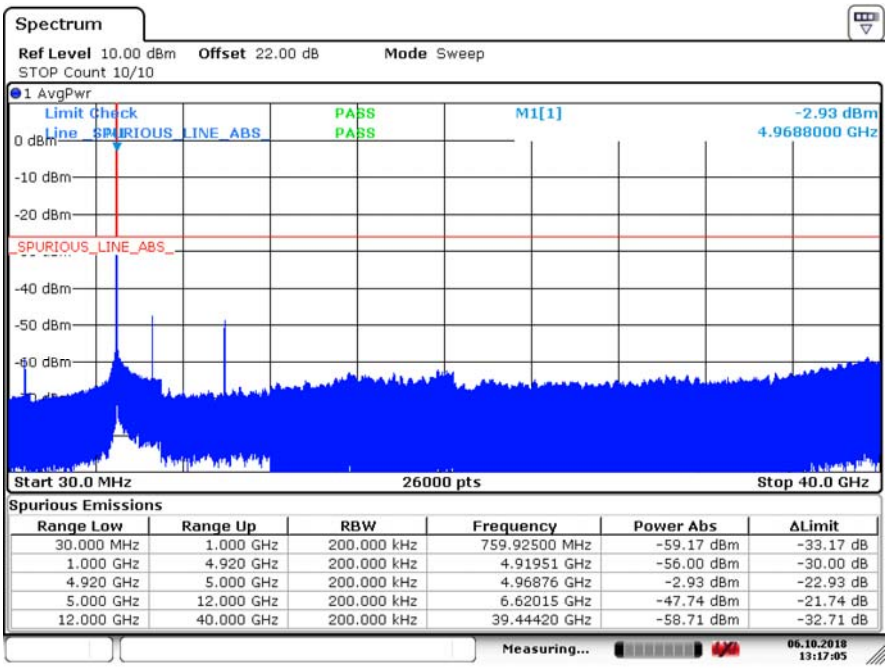
Antennna Port 2

4950 MHz



Date: 6.OCT.2018 13:17:59

4965 MHz

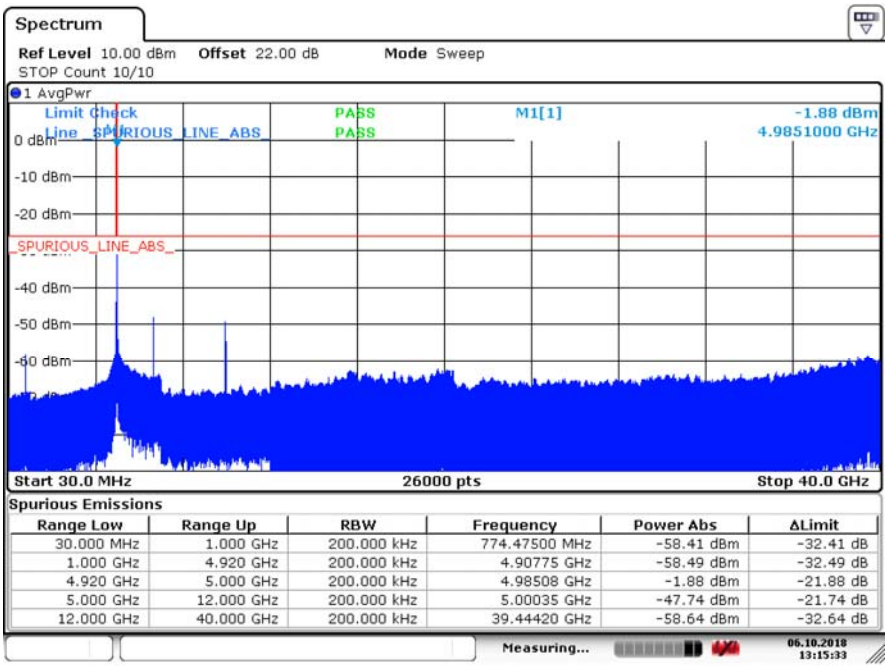


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	200.000 kHz	759.92500 MHz	-59.17 dBm	-33.17 dB
1.000 GHz	4.920 GHz	200.000 kHz	4.91951 GHz	-56.00 dBm	-30.00 dB
4.920 GHz	5.000 GHz	200.000 kHz	4.96876 GHz	-2.93 dBm	-22.93 dB
5.000 GHz	12.000 GHz	200.000 kHz	6.62015 GHz	-47.74 dBm	-21.74 dB
12.000 GHz	40.000 GHz	200.000 kHz	39.44420 GHz	-58.71 dBm	-32.71 dB

Date: 6.OCT.2018 13:17:06

4980 MHz



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	200.000 kHz	774.47500 MHz	-58.41 dBm	-32.41 dB
1.000 GHz	4.920 GHz	200.000 kHz	4.90775 GHz	-58.49 dBm	-32.49 dB
4.920 GHz	5.000 GHz	200.000 kHz	4.98508 GHz	-1.88 dBm	-21.88 dB
5.000 GHz	12.000 GHz	200.000 kHz	5.00035 GHz	-47.74 dBm	-21.74 dB
12.000 GHz	40.000 GHz	200.000 kHz	39.44420 GHz	-58.64 dBm	-32.64 dB

Date: 6.OCT.2018 13:15:33

10 FCC §2.1051, §90.210 & ISEDC RSS-111 §5.5 - Radiated TX Spurious Emissions

10.1 Applicable Standard

FCC §90.210

(l) Emission Mask L. For low power transmitters (20 dBm or less) operating in the 4940-4990 MHz frequency band, the power spectral density of the emissions must be attenuated below the output power of the transmitter as follows:

(1) On any frequency removed from the assigned frequency between 0-45% of the authorized bandwidth (BW): 0 dB.

(2) On any frequency removed from the assigned frequency between 45-50% of the authorized bandwidth: 219 log (% of (BW)/45) dB.

(3) On any frequency removed from the assigned frequency between 50-55% of the authorized bandwidth: 10 + 242 log (% of (BW)/50) dB.

(4) On any frequency removed from the assigned frequency between 55-100% of the authorized bandwidth: 20 + 31 log (% of (BW)/55) dB attenuation.

(5) On any frequency removed from the assigned frequency between 100-150% of the authorized bandwidth: 28 + 68 log (% of (BW)/100) dB attenuation.

(6) On any frequency removed from the assigned frequency above 150% of the authorized bandwidth: 40 dB.

(7) The zero dB reference is measured relative to the highest average power of the fundamental emission measured across the designated channel bandwidth using a resolution bandwidth of at least one percent of the occupied bandwidth of the fundamental emission and a video bandwidth of 30 kHz. The power spectral density is the power measured within the resolution bandwidth of the measurement device divided by the resolution bandwidth of the measurement device. Emission levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least one percent of the occupied bandwidth.

ISEDC RSS-111,

5.5 Transmitter Unwanted Emissions
Transmitter unwanted emissions shall be measured according to the method described in Section 4.3.

On any frequency f, offset from the channel centre frequency fc by a separation fd (expressed as a percentage of the channel bandwidth), the power spectral density of the unwanted emissions for low- and high-power transmitters shall comply with the limits specified below in Table 2. Figure 1 shows the emission mask for low- and high-power transmitters. For equipment with multiple transmitters, the unwanted emissions of each transmitter shall comply with the emission limits based on the output power of the transmitter regardless of the total output power of the equipment (i.e. total output power from all the transmitters).

Table 2 — Emission Mask for Low- and High-power Transmitters		
Offset Frequency f_d (% of the Equipment's Channel Bandwidth)	**Minimum Attenuation (dB)**	
	Low-power Transmitter	**High-power Transmitter**
$0 < f_d \leq 45$	0	0
$45 < f_d \leq 50$	219 log (f_d/45)	568 log (f_d/45)
$50 < f_d \leq 55$	10 + 242 log (f_d/50)	26 + 145 log (f_d/50)
$55 < f_d \leq 100$	20 + 31 log (f_d/55)	32 + 31 log (f_d/55)
$100 < f_d \leq 150$	28 + 68 log (f_d/100)	40 + 57 log (f_d/100)
$f_d > 150$	40	whichever is less stringent 50 or 55 + 10 log p
Where: f_d (%) = ((f-f_c)/channel bandwidth) x 100 p: transmitter's output power (in watts), measured as per Section 4.1		

10.2 Test Procedure

For the radiated emissions test, the EUT host, and all support equipment power cords were connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter or 1.5 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The frequency range up to 40GHz was investigated.

10.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Analyzer, Spectrum	E4446A	US44300386	2018-06-01	1 year
Sunol Sciences	System Controller	SC99V	011003-1	N/R	N/A
Sunol Sciences	Antenna, Biconi-Log	JB1	A013105-3	2018-02-26	2 years
Agilent	Amplifier, Pre	8447D	2944A10187	2018-04-02	1 year
IW	AOBOR Hi frequency CoAX Cable	DC 1531	KPS-1501A3960KPS	2018-01-04	1 year
-	Hi frequency CoAX Cable	-	-	Each time[1]	N/A
-	SMA cable	-	C00011	Each time[1]	N/A
Agilent	Pre-Amplifier	8449B	3147A00400	2018-02-02	1 year
A.H. Systems	Pre-Amplifer	PAM 1840V	170	2018-09-10	1 Year
Sunol Sciences	Antenna, Horn	DRH-118	A052704	2017-03-27	2 years
Wisewave	Antenna, Horn	ARH-4223-02	10555-01	2018-02-14	2 years
Wisewave	Antenna, Horn	ARH-2823-02	10555-02	2017-12-15	2 years
Vasona	Test software	V6.0 build 11	10400213	N/R	N/R

Note[1]: cables and attenuators included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

10.4 Test Environmental Conditions

Temperature:	20-25 °C
Relative Humidity:	35-40 %
ATM Pressure:	101-102 kPa

The testing was performed by Harry Zhao on 2018-10-09 in the 5 meter chamber 3.

10.5 Test Results

Worst Margin: -1.32 dB at 6600 MHz in the Vertical polarization for the Dish Antenna.

25 dBi Dish Antenna

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	Cord. Reading (dBm)	FCC/ISEDC	
			Height (cm)	Polarity (H/V)	Factor (dB/m)					Limit (dBm)	Margin (dB)
Low Channel 4950 MHz											
89.8	28.24	0	213	H	13.90	0.84	21.17	21.81	-73.39	-20.70	-52.69
89.8	32.15	0	243	V	13.90	0.84	21.17	25.72	-69.48	-21.3	-48.18
120.5	25.63	0	213	H	20.40	0.93	28.13	18.82	-76.38	-20.70	-55.68
99.5	32.08	0	243	V	16.70	0.93	28.13	21.57	-73.63	-21.3	-52.33
60.7	27.59	0	213	H	13.50	0.78	18.85	23.02	-72.18	-20.70	-51.48
6600	24.93	0	265	H	34.43	9.39	0.00	68.75	-26.45	-20.70	-5.75
6600	28.76	0	265	V	34.43	9.39	0.00	72.58	-22.62	-21.30	**-1.32**
9900	42.42	0	265	H	38.14	12.06	35.79	56.83	-38.37	-20.70	-17.67
9900	39.25	0	265	V	38.14	12.06	35.79	53.66	-41.54	-21.30	-20.24
14850	25.23	0	265	H	41.80	14.42	33.32	48.13	-47.07	-20.70	-26.37
14850	24.42	0	265	V	41.80	14.42	33.32	47.32	-47.88	-21.30	-26.58
Middle Channel 4965 MHz											
89.8	28.35	0	213	H	13.90	0.84	21.17	21.92	-73.28	-21.30	-51.98
89.8	32.32	0	243	V	13.90	0.84	21.17	25.89	-69.31	-21.80	-47.51
120.5	26.90	0	213	H	20.40	0.93	28.13	20.09	-75.11	-21.30	-53.81
99.5	32.04	0	243	V	16.70	0.93	28.13	21.53	-73.67	-21.80	-51.87
60.7	27.59	0	213	H	13.50	0.78	18.85	23.02	-72.18	-21.30	-50.88
60.7	31.21	0	243	V	13.50	0.78	18.85	26.64	-68.56	-21.80	-46.76
6620	23.65	0	265	H	34.43	9.39	0.00	67.47	-27.73	-21.30	-6.43
6620	27.79	0	265	V	34.43	9.39	0.00	71.61	-23.59	-21.80	-1.79
9930	40.89	0	265	H	38.38	12.06	35.79	55.54	-39.66	-21.30	-18.36
9930	40.54	0	265	V	38.38	12.06	35.79	55.19	-40.01	-21.80	-18.21
14895	24.81	0	265	H	41.56	14.42	33.32	47.47	-47.74	-21.30	-26.44
14895	24.37	0	265	H	41.56	14.42	33.32	47.03	-48.18	-21.80	-26.38
High Channel 4980 MHz											
89.8	28.12	0	213	H	13.90	0.84	21.17	21.69	-73.51	-21.20	-52.31
89.8	32.34	0	243	V	13.90	0.84	21.17	25.91	-69.29	-21.60	-47.69
120.5	24.69	0	213	H	20.40	0.93	28.13	17.88	-77.32	-21.20	-56.12
99.5	31.74	0	243	V	16.70	0.93	28.13	21.23	-73.97	-21.60	-52.37
60.7	24.65	0	213	H	13.50	0.78	18.85	20.08	-75.12	-21.20	-53.92
60.7	30.54	0	243	V	13.50	0.78	18.85	25.97	-69.23	-21.60	-47.63
6640	23.86	0	265	H	34.65	9.39	0.00	67.90	-27.30	-21.20	-6.10
6640	27.12	0	265	V	34.65	9.39	0.00	71.16	-24.04	-21.60	-2.44
9960	39.98	0	265	H	38.38	12.06	35.72	54.70	-40.50	-21.20	-19.30
9960	41.46	0	265	V	38.38	12.06	35.72	56.18	-39.02	-21.60	-17.42
14940	21.62	0	265	V	41.22	14.42	33.32	43.93	-51.27	-21.20	-30.07
14940	21.83	0	265	V	41.22	14.42	33.32	44.14	-51.06	-21.60	-29.46

8 dBi Internal Antenna

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	Cord. Reading (dBm)	FCC/ISEDC	
			Height (cm)	Polarity (H/V)	Factor (dB/m)					Limit (dBm)	Margin (dB)
Low Channel 4950 MHz											
89.8	27.82	0	213	H	13.90	0.84	21.17	21.39	-73.81	-17.00	-56.81
89.8	30.13	0	243	V	13.90	0.84	21.17	23.70	-71.50	-18.50	-53.00
120.5	27.41	0	213	H	20.40	0.93	28.13	20.60	-74.60	-17.00	-57.60
101.1	29.12	0	243	V	16.70	0.93	28.13	18.61	-76.59	-18.50	-58.09
60.7	27.65	0	213	H	13.50	0.78	18.85	23.08	-72.12	-17.00	-55.12
60.7	30.47	0	243	V	13.50	0.78	18.85	25.90	-69.30	-18.50	-50.80
6600	14.78	0	213	H	34.43	9.39	0.00	58.60	-36.60	-17.00	-19.60
6600	15.00	0	243	V	34.43	9.39	0.00	58.82	-36.38	-18.50	-17.88
9900	48.98	0	213	H	38.14	12.06	35.79	63.39	-31.81	-17.00	-14.81
9900	45.44	0	243	V	38.14	12.06	35.79	59.85	-35.35	-18.50	-16.85
14850	35.11	0	213	H	41.80	14.42	33.32	58.01	-37.19	-17.00	-20.19
14850	34.98	0	243	V	41.80	14.42	33.32	57.88	-37.32	-18.50	-18.82
Middle Channel 4965 MHz											
89.8	28.06	0	213	H	13.90	0.84	21.17	21.63	-73.57	-17.00	-56.57
89.8	30.26	0	243	V	13.90	0.84	21.17	23.83	-71.37	-18.40	-52.97
120.5	25.50	0	213	H	20.40	0.93	28.13	18.69	-76.51	-17.00	-59.51
101.1	29.72	0	243	V	16.70	0.93	28.13	19.21	-75.99	-18.40	-57.59
60.7	27.48	0	213	H	13.50	0.78	18.85	22.91	-72.29	-17.00	-55.29
60.7	31.81	0	243	V	13.50	0.78	18.85	27.24	-67.96	-18.40	-49.56
6620	14.28	0	213	H	34.43	9.39	0.00	58.10	-37.10	-17.00	-20.10
6620	14.06	0	243	V	34.43	9.39	0.00	57.88	-37.32	-18.40	-18.92
9930	49.95	0	213	H	38.38	12.06	35.79	64.60	-30.60	-17.00	-13.60
9930	46.82	0	243	V	38.38	12.06	35.79	61.47	-33.73	-18.40	-15.33
14895	33.36	0	213	H	41.56	14.42	33.32	56.02	-39.19	-17.00	-22.19
14895	29.92	0	243	V	41.56	14.42	33.32	52.58	-42.63	-18.40	-24.23
High Channel 4980 MHz											
89.8	29.67	0	213	H	13.90	0.84	21.17	23.24	-71.96	-17.10	-54.86
89.8	30.51	0	243	V	13.90	0.84	21.17	24.08	-71.12	-18.40	-52.72
120.5	27.62	0	213	H	20.40	0.93	28.13	20.81	-74.39	-17.10	-57.29
101.1	29.85	0	243	V	16.70	0.93	28.13	19.34	-75.86	-18.40	-57.46
60.7	28.11	0	213	H	13.50	0.78	18.85	23.54	-71.66	-17.10	-54.56
60.7	31.76	0	243	V	13.50	0.78	18.85	27.19	-68.01	-18.40	-49.61
6640	13.41	0	213	H	34.65	9.39	0.00	57.45	-37.75	-17.10	-20.65
6640	13.16	0	243	V	34.65	9.39	0.00	57.20	-38.00	-18.40	-19.60
9960	50.62	0	213	H	38.38	12.06	35.72	65.34	-29.86	-17.10	-12.76
9960	46.46	0	243	V	38.38	12.06	35.72	61.18	-34.02	-18.40	-15.62
14940	32.62	0	213	H	41.22	14.42	33.32	54.93	-40.27	-17.10	-23.17
14940	29.18	0	243	V	41.22	14.42	33.32	51.49	-43.71	-18.40	-25.31

Note[1]: Cord.Reading (dBm) = Cord.Reading (dBµV/m) - 95.2
Note[2]: Limit = Fundamental Channel Power (e.i.r.p) measured in chamber– 40 dB

25 dBi Dish Antenna

Frequency (MHz)	Fundamental Channel Power (e.i.r.p) measured in chamber	
	Horizontal Polaization	Vertical Polaization
4950	19.3 dBm	18.7 dBm
4965	18.7 dBm	18.2 dBm
4980	18.8 dBm	18.4 dBm

8 dBi Internal Antenna

Frequency (MHz)	Fundamental Channel Power (e.i.r.p) measured in chamber	
	Horizontal Polaization	Vertical Polaization
4950	23 dBm	21.5 dBm
4965	23 dBm	21.6 dBm
4980	22.9 dBm	21.6 dBm

11 FCC §90.1213, §2.1055 &ISEDC RSS-111 §5.2 - Frequency Stability

11.1 Applicable Standard

FCC §2.1055,

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From −30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

ISEDC RSS-111 §5.2

5.2 Transmitter Frequency Stability

The applicant shall ensure frequency stability by showing that the occupied bandwidth is maintained within the band of operation when tested at the temperature and supply voltage variations specified for the frequency stability measurement in RSS-Gen.

11.2 Test Procedure

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

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

Frequency Stability vs. Voltage: An external variable AC power supply Source. The voltage was set to 115% and 85% of the nominal value. The output frequency was recorded for each voltage.

11.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates	Calibration Interval
Rhode & Schwarz	Spectrum Analyzer	FSV40	1321.3008K39-101203-UW	2018-07-23	1 year
Espec	Chamber, Environmental	ESL-4CA	18010	2018-02-23	1 year
-	SMA cable	-	-	Each time[1]	N/A

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

11.4 Test Environmental Conditions

Temperature:	20-25 °C
Relative Humidity:	44-55 %
ATM Pressure:	101-102 kPa

The testing was performed by Harry Zhao on 2018-10-09 in the RF Site.

11.5 Test Results

Antenna Port 1

4950 MHz

Test Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (ppm)
Voltage (Vac)	Temperature (^{o}C)			
Frequency vs. Temperature				
120	50	4950	4950.0282	5.69
120	40	4950	4950.0375	7.58
120	30	4950	4950.0313	6.31
120	20	4950	4950.0375	7.58
120	10	4950	4950.0406	8.20
120	0	4950	4950.0313	6.31
120	-10	4950	4950.0281	5.68
120	-20	4950	4950.0282	5.69
120	-30	4950	4950.0188	3.79
Frequency vs. Voltage				
102	20	4950	4950.0406	8.20
138	20	4950	4950.0400	8.08

4965 MHz

Test Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (ppm)
Voltage (Vac)	Temperature (^{o}C)			
Frequency vs. Temperature				
120	50	4965	4965.0344	6.92
120	40	4965	4965.0375	7.55
120	30	4965	4965.0313	6.29
120	20	4965	4965.0375	7.55
120	10	4965	4965.0344	6.93
120	0	4965	4965.0407	8.19
120	-10	4965	4965.0375	7.55
120	-20	4965	4965.0282	5.67
120	-30	4965	4965.0407	8.19
Frequency vs. Voltage				
102	20	4965	4965.0344	6.93
138	20	4965	4965.0406	8.18

4980 MHz

Test Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (ppm)
Voltage (Vac)	Temperature (^{o}C)			
Frequency vs. Temperature				
120	50	4980	4980.0344	6.90
120	40	4980	4980.0375	7.53
120	30	4980	4980.0375	7.53
120	20	4980	4980.0406	8.15
120	10	4980	4980.0469	9.42
120	0	4980	4980.0438	8.79
120	-10	4980	4980.0281	5.64
120	-20	4980	4980.0282	5.65
120	-30	4980	4980.0226	4.53
Frequency vs. Voltage				
102	20	4980	4980.0375	7.53
138	20	4980	4980.0313	6.28

Antenna Port 2

4950 MHz

Test Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (ppm)
Voltage (Vac)	Temperature (°C)			
Frequency vs. Temperature				
120	50	4950	4950.0000	0.00
120	40	4950	4950.0032	0.64
120	30	4950	4950.0063	1.26
120	20	4950	4950.0032	0.64
120	10	4950	4950.0032	0.64
120	0	4950	4950.0031	0.63
120	-10	4950	4950.0031	0.63
120	-20	4950	4950.0063	1.26
120	-30	4950	4950.0032	0.64
Frequency vs. Voltage				
102	20	4950	4949.9938	-1.26
138	20	4950	4950.0063	1.26

4965 MHz

Test Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (ppm)
Voltage (Vac)	Temperature (°C)			
Frequency vs. Temperature				
120	50	4965	4964.9969	-0.63
120	40	4965	4964.9969	-0.63
120	30	4965	4965.0032	0.63
120	20	4965	4965.0032	0.63
120	10	4965	4965.0063	1.26
120	0	4965	4965.0063	1.26
120	-10	4965	4965.0031	0.62
120	-20	4965	4965.0032	0.63
120	-30	4965	4965.0031	0.62
Frequency vs. Voltage				
102	20	4965	4965.0032	0.63
138	20	4965	4965.0000	0.00

4980 MHz

Test Condition		Reference Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (ppm)
Voltage (Vac)	Temperature (°C)			
Frequency vs. Temperature				
120	50	4980	4980.0000	0.00
120	40	4980	4980.0031	0.62
120	30	4980	4979.9969	-0.63
120	20	4980	4980.0031	0.62
120	10	4980	4980.0031	0.62
120	0	4980	4980.0063	1.26
120	-10	4980	4980.0094	1.88
120	-20	4980	4980.0032	0.63
120	-30	4980	4980.0032	0.63
Frequency vs. Voltage				
102	20	4980	4980.0063	1.26
138	20	4980	4980.0000	0.00

12 Appendix A (Normative) FCC & ISEDC Labeling Requirements

12.1 FCC ID Label Requirement

Per FCC Part 2.925, (a) Each equipment covered in an application for equipment authorization shall bear a nameplate or label listing the following:

(1) FCC Identifier consisting of the two elements in the exact order specified in §2.926. The FCC Identifier shall be preceded by the term FCC ID in capital letters on a single line, and shall be of a type size large enough to be legible without the aid of magnification.

Example: FCC ID: XXX123

Where: XXX—Grantee Code, 123—Equipment Product Code

(b) The grantee code assigned pursuant to paragraph (c) of this section is assigned permanently to applicants/grantees and is valid only for the party specified as the applicant/grantee in the code assignment(s).

(c) A grantee code will have three characters consisting of Arabic numerals, capital letters, or combination thereof

(d) The equipment product code assigned by the grantee shall consist of a series of Arabic numerals, capital letters or a combination thereof, and may include the dash or hyphen (-). The total of Arabic numerals, capital letters and dashes or hyphens shall not exceed 14 and shall be one which has not been previously used in conjunction with:

12.2 IC Label Requirements

Per IC RSP-100, Issue 10 §3.1

Every unit of Category I radio apparatus certified for marketing and use in Canada shall bear a label identified by a unique combination of a model number and a certification number, which are assigned as described below in this section. This label shall be permanently affixed to the device or displayed electronically and its text must be clearly legible. If the dimensions of the device are too small or if it is not practical to place the label on the device and electronic labelling has not been implemented, the label shall be, upon agreement with Industry Canada, placed in a prominent location in the user manual supplied with the device. The user manual may be in an electronic format and must be readily available. The model number is assigned by the applicant and shall be unique to each model of radio apparatus. The model number shall be clearly indicated by a prefix such as “Model:”. The word "Model" may be abbreviated; for example, the model number displayed on the label and preceded by the text “M / N:”, or equivalent, is acceptable.

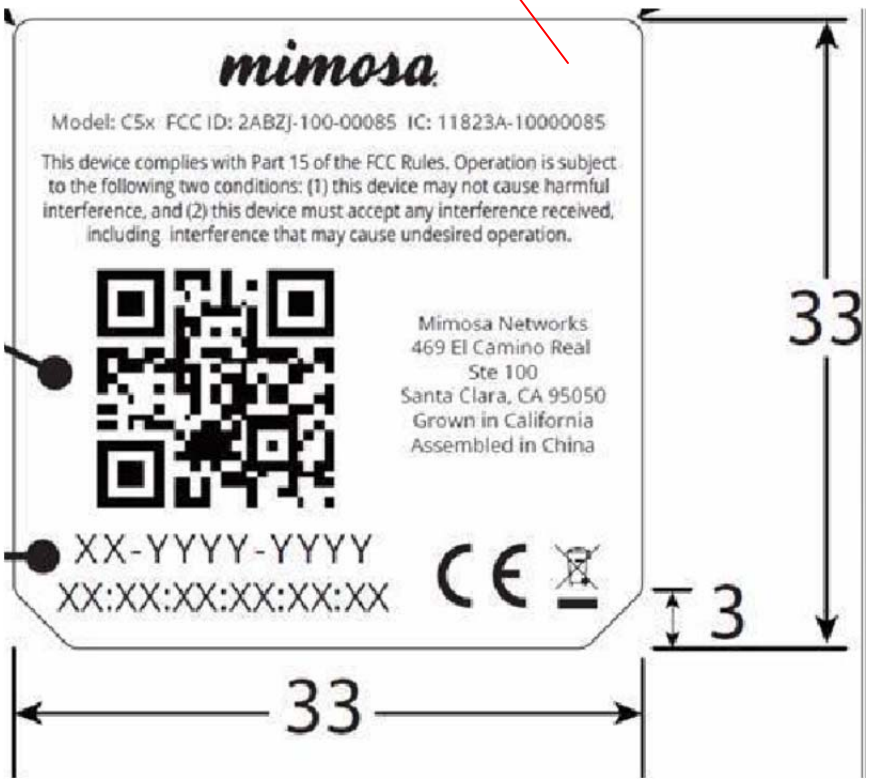
The certification number is made up of a Company Number (CN), assigned by Industry Canada’s Certification and Engineering Bureau, followed by the Unique Product Number (UPN) assigned by the applicant. The certification number shall appear as follows:

IC: XXXXXX-YYYYYYYYYYY

Where:

• XXXXXX is the Company Number (CN) assigned by Industry Canada, made up of 6 alphanumeric characters (A-Z, 0-9) at most, including a letter at the end of the CN to distinguish between different addresses for the same company;
• YYYYYYYYYYY is the Unique Product Number (UPN) assigned by the applicant, made up of 11 alphanumeric characters (A-Z, 0-9) at most; and

12.3 FCC ID & IC Label Contents and Location



13 Appendix B - EUT Photographs

Please see attachments:

Exhibit – EUT Test Setup Photographs
Exhibit – EUT External Photographs
Exhibit – EUT Internal Photographs

14 Appendix C (Normative) - A2LA Electrical Testing Certificate

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets A2LA *R222 - Specific Requirements EPA ENERGY STAR Accreditation Program*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system *(refer to joint ISO-ILAC-IAF Communiqué dated April 2017)*.

Presented this 2nd day of October 2018.

President and CEO
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2020

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

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