

## TEST REPORT

**Application No.:** SHCR2308001590AT  
**FCC ID:** VPYLB2AB  
**IC:** 772C-LB2AB  
**Applicant:** Murata Manufacturing Co., Ltd.  
**Address of Applicant:** 10-1, Higashikotari 1-chome, Nagaokakyo-shi Kyoto 617-8555 Japan  
**Manufacturer:** Murata Manufacturing Co., Ltd.  
**Address of Manufacturer:** 10-1, Higashikotari 1-chome, Nagaokakyo-shi Kyoto 617-8555 Japan  
**Factory:** Shenzhen Murata Technology Co., Ltd.  
**Address of Factory:** 15 Cuijing Road, Shenzhen Grand Industrial Zone, Pingshan District, Shenzhen 518118 China

**Equipment Under Test (EUT):**

**EUT Name:** UWB+BLE Combo Module plus 1055 ANT  
**Model No.:** LBUA5QJ2AB  
**Trade Mark:** Murata  
**Standard(s) :** 47 CFR Part 15, Subpart F  
 RSS-220 Issue 1, July 2018 Amendment 1  
 RSS-Gen Issue 5 Amendment 2 (February 2021)

**Date of Receipt:** 2023-07-01  
**Date of Test:** 2023-07-01 to 2023-08-08  
**Date of Issue:** 2023-08-11

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

*Parlan Zhan*

Parlan Zhan  
 Laboratory Manager



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Revision Record			
Version	Description	Date	Remark
00	Updated product name; Added new AoA/PDoA antenna for UWB	2023-08-11	Based on KSCR211000018402

Authorized for issue by:			
			
		<hr/> <b>Micheal Niu /Project Engineer</b>	
			
		<hr/> <b>Parlam Zhan /Reviewer</b>	



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## 2 Test Summary

Radio Spectrum Technical Requirement				
Item	FCC Requirement	IC Requirement	Method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203 & Subpart F Section 15.519 (a)(2)	RSS-Gen Clause 6.8	ANSI C63.10 (2013)	Customer Declaration

Radio Spectrum Matter Part				
Item	FCC Requirement	IC Requirement	Method	Result
Spurious Emissions	47 CFR Part 15, Subpart F Section 15.519 (c)(d) & 15.209 & 15.521(c)(d)(e)(h)	RSS-220 Clause 5.3.1(c) (d) (e)	ANSI C63.10 (2013)	PASS
EIRP	47 CFR Part 15, Subpart F Section 15.519 (e) & 15.521(g)	RSS-220 Clause 5.3.1(g)	ANSI C63.10 (2013)	PASS

Note: Added a new AoA/PDoA antenna for UWB, only EIRP and Spurious Emissions for the new AoA/PDoA antenna were retested in this new report, other test data refer to original report KSCR211000018402.



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## 4 General Information

### 4.1 Details of E.U.T.

Power supply:	DC 2.5V~3.6V
Test voltage:	DC 3V
Product category:	Hand held
Operation Frequency:	Channel 5: 6489.6MHz Channel 9: 7987.2MHz
Number of Channels	2
Modulation Type	BPM+BPSK
Antenna Gain	AoA/PDoA antenna I: Antenna 1(RX): 1.7dBi for 6489.6MHz; -0.9dBi for 7987.2MHz(Provided by manufacturer) Antenna 2(TX/RX): 1.8dBi for 6489.6MHz; -1.5dBi for 7987.2MHz(Provided by manufacturer) TWR/TDoA antenna: 3.9dBi for 6489.6MHz; 2.8dBi for 7987.2MHz(Provided by manufacturer) AoA/PDoA antenna II: Antenna 1(RX): 0.3dBi for 6489.6MHz; 2.7dBi for 7987.2MHz(Provided by manufacturer) Antenna 2(TX/RX): 0.9dBi for 6489.6MHz; 2.8dBi for 7987.2MHz(Provided by manufacturer)
Antenna Type	AoA/PDoA antenna I: Antenna 1(RX): PCB Antenna; Antenna 2(TX/RX): PCB Antenna TWR/TDoA antenna: PCB Antenna AoA/PDoA antenna II: Antenna 1(RX): PCB Antenna; Antenna 2(TX/RX): PCB Antenna
Serial Number:	4A309935
Firmware Version:	V0.6.0

### 4.2 Power level setting using in test:

Channel	Power Setting
5	0X85855C85
9	0XA5A570A5



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**4.3 Description of Support Units**

Description	Manufacturer	Model No.	Serial No.
DC Power Supply	Agilent	E3632A	/
Notebook	LENOVO	E40	/
SSCOM	/	/	/



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**4.4 Measurement Uncertainty**

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4 x 10 <sup>-8</sup>
2	Timeout	2s
3	Duty Cycle	0.4%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious Emission Test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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### 4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc ) is provided by the applicant. (if applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).

### 4.6 Test Facility

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

• **A2LA (Certificate No. 6332.01)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

• **FCC (Designation Number: CN1301)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• **ISED (CAB Identifier: CN0020)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 8617A

• **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

### 4.7 Deviation from Standards

None

### 4.8 Abnormalities from Standard Conditions

None



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## 5 Equipment List

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
<b>RF Radiated Test</b>					
EMI test Receiver	R&S	ESU40	SHEM051-1	2022-12-20	2023-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2022-12-20	2023-12-19
Communication Tester	R&S	CMW500	SHEM268-1	2023-06-01	2024-05-31
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2022-12-20	2023-12-19
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2021-09-11	2023-09-10
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2022-05-07	2024-05-06
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2022-08-11	2024-08-10
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2021-09-18	2023-09-17
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2021-09-18	2023-09-17
Pre-Amplifier	HP	8447D	SHEM236-1	2022-08-02	2023-08-01
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2022-12-20	2023-12-19
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2021-05-25	2024-05-24
RE test Cable	/	RE01, RE02, RE06	/	2023-01-07	2024-01-06
Test software	FARAD	EZ EMC	1.1.4.2	/	/



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## 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.519(a)(2); RSS-Gen Clause 6.8

#### 6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.519(a) (2) requirement:

The use of antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited. Antennas may be mounted only on the hand held UWB device.

RSS 220 Clause 5.1 requirement:

The antenna of the UWB device shall be factory-installed and shall not be made modifiable by users.

EUT Antenna:

The antennas for the EUT are PCB antennas and no consideration of replacement. The gains of antennas are 0.3dBi at 6489.6MHz and 2.7dBi at 7987.2MHz for antenna 1 and 0.9dBi at 6489.6MHz and 2.8dBi at 7987.2MHz for antenna 2.

Antenna location: Refer to Appendix (Internal Photos)



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## 7 Radio Spectrum Matter Test Results

### 7.1 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart F Section 15.519 (c)(d) & 15.209 & 15.521 (c)(d)(e)(g)(h)  
RSS-220 Clause 5.3.1(c) (d) (e)

Test Method: ANSI C63.10: 2013

Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-960MHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
Above 960MHz	RMS	1MHz	3MHz	RMS	

Limit For FCC (Spurious Emissions)	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1610MHz	-75.3 dBm (EIRP, RBW=1MHz)		RMS	3
	1610MHz-1990MHz	-63.3 dBm (EIRP, RBW=1MHz)		RMS	3
	1990MHz-3100MHz	-61.3 dBm (EIRP, RBW=1MHz)		RMS	3
	3100MHz-10600MHz	-41.3 dBm (EIRP, RBW=1MHz)		RMS	3
	3100MHz-10600MHz	0 dBm (EIRP, RBW=50MHz)		Peak	3
	Above 10600MHz	-61.3 dBm (EIRP, RBW=1MHz)		RMS	3
	1164MHz-1240MHz	-85.3 dBm (EIRP, RBW=1kHz)		RMS	3
1559MHz-1610MHz	-85.3 dBm (EIRP, RBW=1kHz)		RMS	3	



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Limit For IC (Spurious Emissions)	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
		0.009MHz-0.490MHz	2400/F(kHz)	-	-
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1610MHz	-75.3 dBm (EIRP, RBW=1MHz)		RMS	3
	1610MHz-4750MHz	-70.0 dBm (EIRP, RBW=1MHz)		RMS	3
	4750MHz-10600MHz	-41.3 dBm (EIRP, RBW=1MHz)		RMS	3
	4750MHz-10600MHz	0 dBm (EIRP, RBW=50MHz)		Peak	3
	Above 10600MHz	-61.3 dBm (EIRP, RBW=1MHz)		RMS	3
	1164MHz-1240MHz	-85.3 dBm (EIRP, RBW=1kHz)		RMS	3
	1559MHz-1610MHz	-85.3 dBm (EIRP, RBW=1kHz)		RMS	3

According to ANSI 63.10 Clause 10.3.9, the EIRP to field strength at a specified measurement distance of 3 m is below:

$$E \text{ (dBuV/m)} = \text{EIRP(dBm)} + 95.3$$

Thus, the field strength limit for the test above 1GHz is below:

For FCC:

Frequency	Limit		Detector	Measurement Distance
	EIRP (dBm)	Field Strength (dBuV/m)		
960MHz-1610MHz	-75.3 (RBW=1MHz)	20.00	RMS	3
1610MHz-1990MHz	-63.3 (RBW=1MHz)	32.00	RMS	3
1990MHz-3100MHz	-61.3 (RBW=1MHz)	34.00	RMS	3
3100MHz-10600MHz	-41.3 (RBW=1MHz)	54.00	RMS	3
3100MHz-10600MHz	0 (RBW=50MHz)	95.3	Peak	3
Above 10600MHz	-61.3 (RBW=1MHz)	34.00	RMS	3
1164MHz-1240MHz	-85.3 (RBW=1kHz)	10.00	RMS	3
1559MHz-1610MHz	-85.3 (RBW=1kHz)	10.00	RMS	3



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For IC:

Frequency	Limit		Detector	Measurement Distance
	EIRP (dBm)	Field Strength (dBuV/m)		
960MHz-1610MHz	-75.3 (RBW=1MHz)	20.00	RMS	3
1610MHz-4750MHz	-70.0 dBm (EIRP, RBW=1MHz)	25.30	RMS	3
4750MHz-10600MHz	-41.3 (RBW=1MHz)	54.00	RMS	3
4750MHz-10600MHz	0 (RBW=50MHz)	95.3	Peak	3
Above 10600MHz	-61.3 (RBW=1MHz)	34.00	RMS	3
1164MHz-1240MHz	-85.3 (RBW=1kHz)	10.00	RMS	3
1559MHz-1610MHz	-85.3 (RBW=1kHz)	10.00	RMS	3



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### 7.1.1 E.U.T. Operation

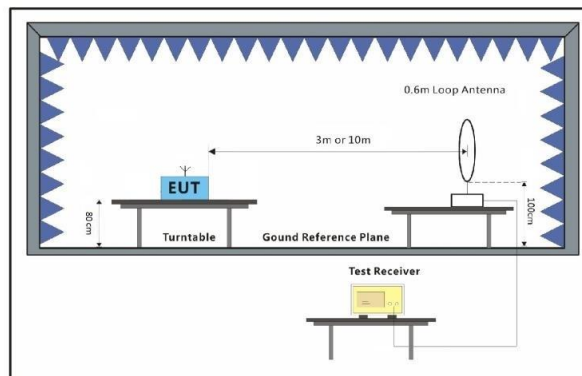
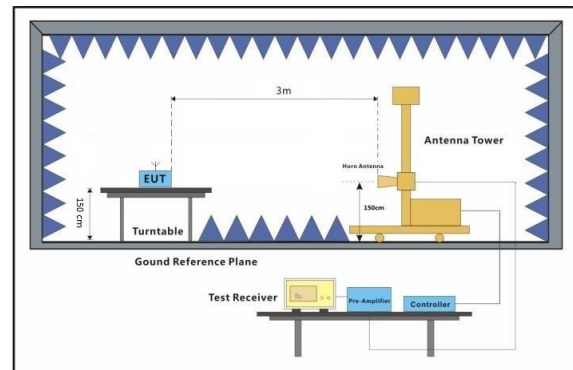
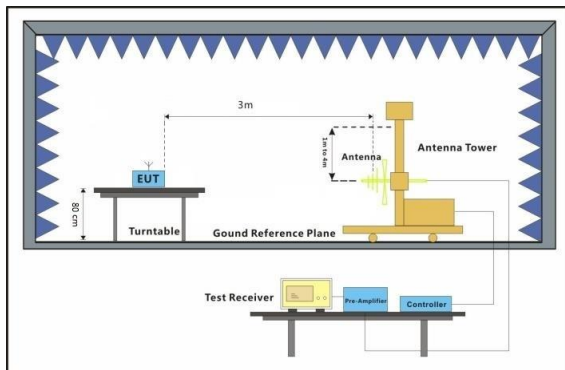
Operating Environment:

Temperature: 25.5 °C Humidity: 50.8 % RH Atmospheric Pressure: 1010 mbar

Test Mode: a:TX mode\_UWB channel 5\_Keep the EUT in continuously transmitting mode with BPM+BPSK modulation

b:TX mode\_UWB channel 9\_Keep the EUT in continuously transmitting mode with BPM+BPSK modulation

### 7.1.2 Test Setup Diagram



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**7.1.3 Measurement Procedure and Data**

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

**Remark:**

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 3) Scan from 9kHz to 40GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.



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**7.1.3.1 Peak Power**

Field Strength for fundamental @ RBW=8MHz				
Frequency (MHz)	Reading Level (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Polarization
6489.6	83.14	-6.36	76.78	Horizontal
6489.6	75.85	-6.36	69.49	Vertical
7987.2	64.36	-1.69	62.67	Horizontal
7987.2	78.43	-1.69	76.74	Vertical

Frequency (MHz)	Measured Field Strength of fundamental (FS <sub>M</sub> ) (dBuV/m)	Limit for RBW=50MHz (L <sub>50M</sub> ) (dBuV/m)	Calculated factor for RBW=50MHz to RBW=8MHz	Limit for RBW=8MHz (L <sub>8M</sub> ) (dBuV/m)	Over Limit(dB)	Polarization
6489.6	76.78	95.30	-15.92	79.38	-2.60	Horizontal
6489.6	69.49	95.30	-15.92	79.38	-9.89	Vertical
7987.2	62.67	95.30	-15.92	79.38	-16.71	Horizontal
7987.2	76.74	95.30	-15.92	79.38	-2.64	Vertical

Note:  $L_{8M} = L_{50M} + 20\log(8\text{MHz}/50\text{MHz}) = L_{50M} - 15.92$



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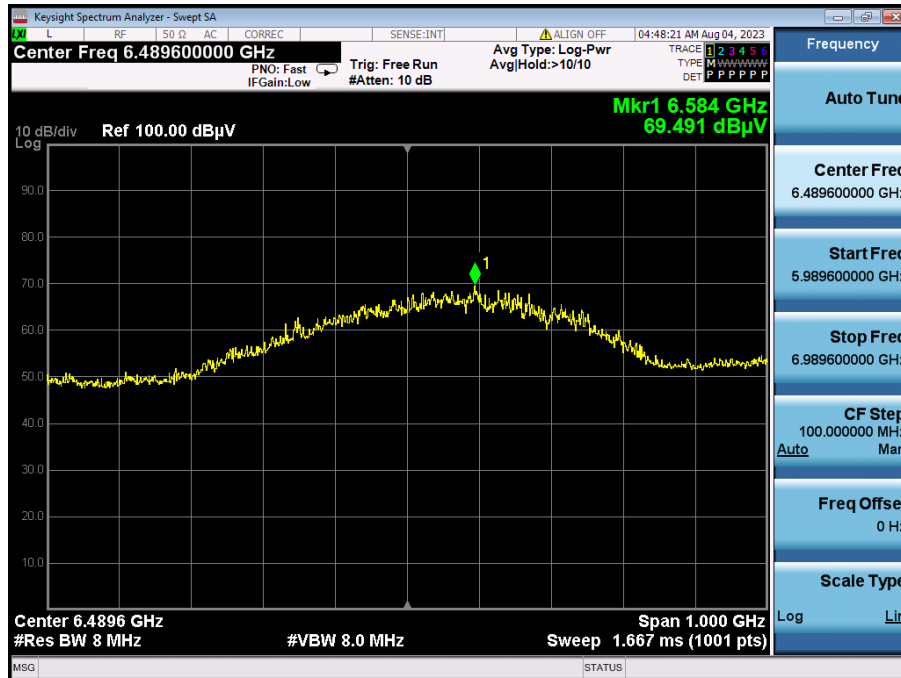


Test plot:

6489.6MHz Horizontal



6489.6MHz Vertical

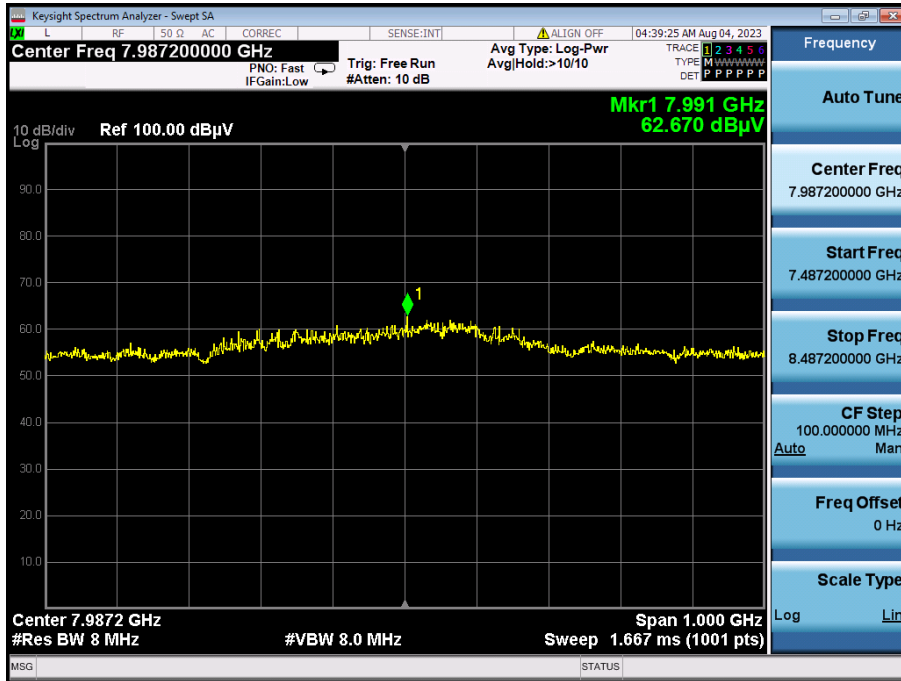


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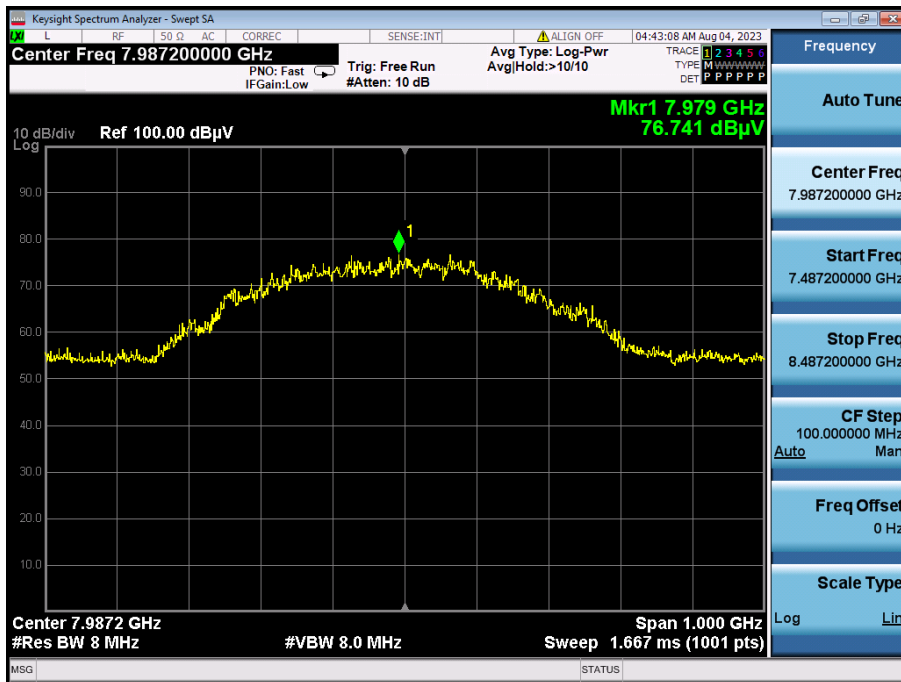
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### 7987.2MHz Horizontal



### 7987.2MHz Vertical



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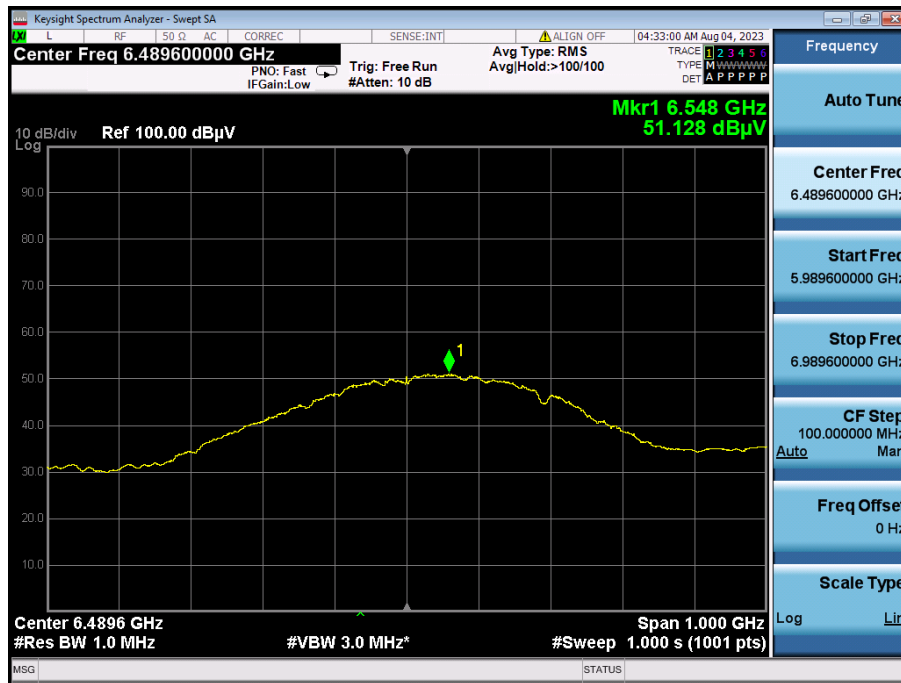
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### 7.1.3.2 RMS Power in a 1 MHz Bandwidth

Field Strength for fundamental @ RBW=1MHz						
Frequency (MHz)	Reading Level (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit(dB)	Polarization
6489.6	57.49	-6.36	51.13	54.00	-2.87	Horizontal
6489.6	49.64	-6.36	43.28	54.00	-10.72	Vertical
7987.2	41.42	-1.69	39.73	54.00	-14.27	Horizontal
7987.2	53.74	-1.69	52.05	54.00	-1.95	Vertical

Test plot:

6489.6MHz Horizontal



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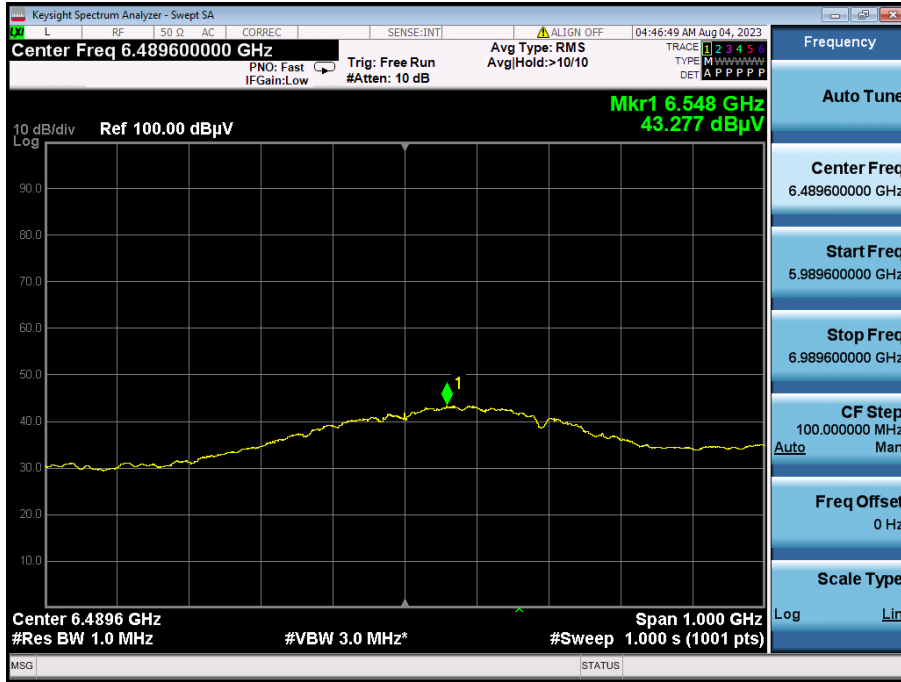
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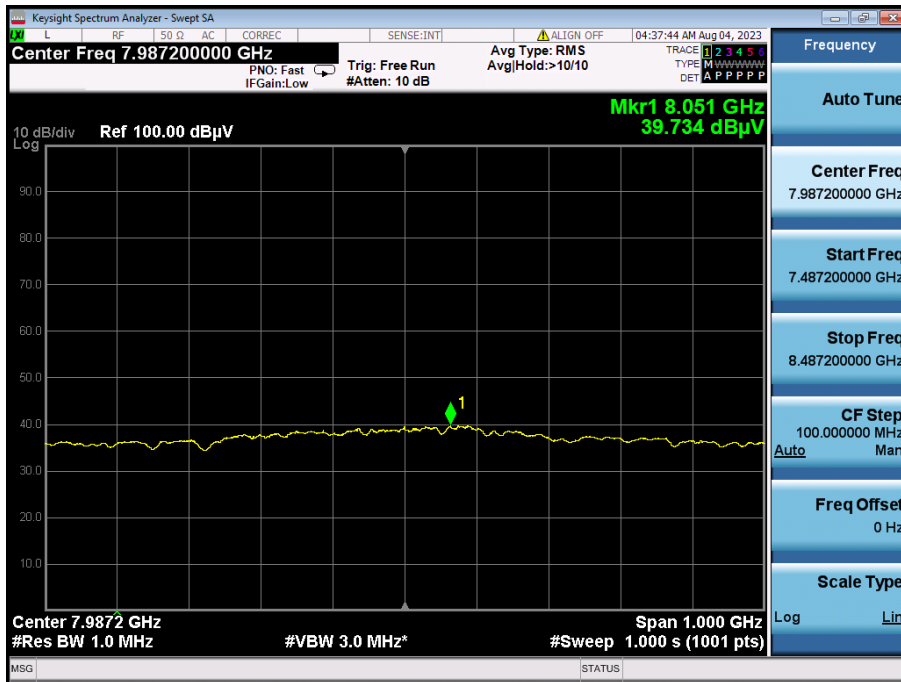
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### 6489.6MHz Vertical



### 7987.2MHz Horizontal



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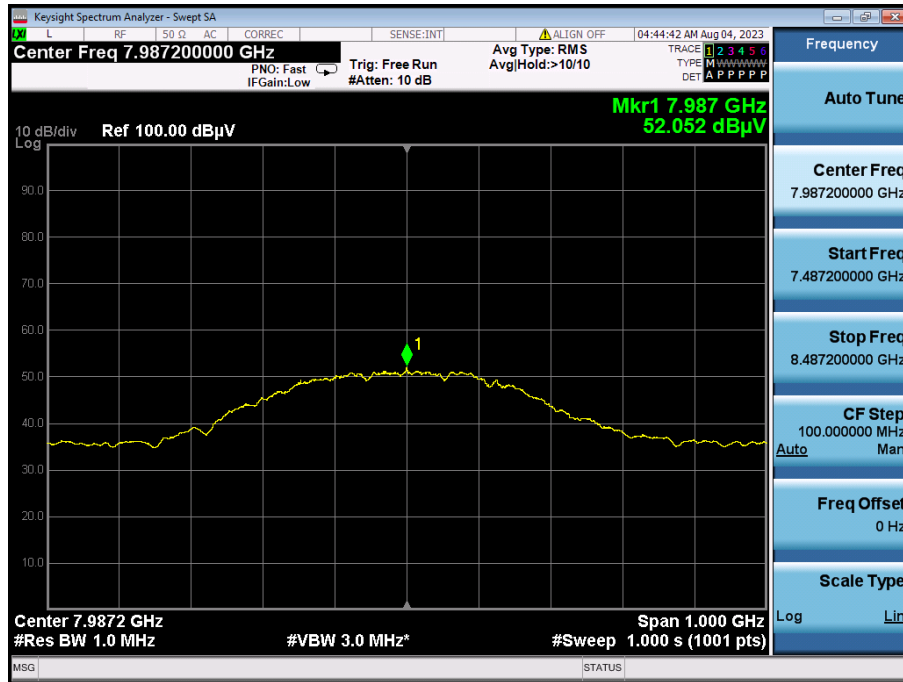


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Report No.: SHCR230800159001

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## 7987.2MHz Vertical



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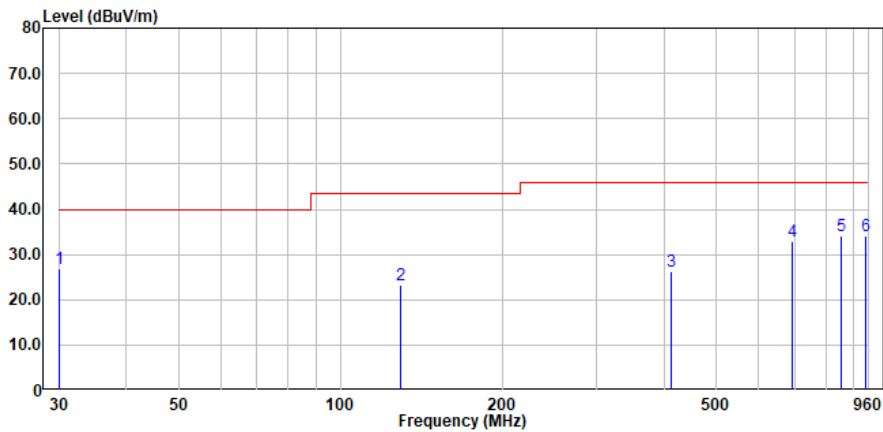
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### 7.1.3.3 Spurious Emissions

30MHz-960MHz

Mode: a; Polarization: Horizontal; Channel: 5



Antenna Polarity :Horizontal

	Freq (MHz)	Read level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	30.00	1.64	25.04	0.29	26.97	40.00	-13.03	QP
2	129.51	3.83	18.42	1.01	23.26	43.50	-20.24	QP
3	413.16	2.25	22.46	1.48	26.19	46.00	-19.81	QP
4	691.23	5.48	25.13	2.44	33.05	46.00	-12.95	QP
5	852.12	5.31	26.66	2.15	34.12	46.00	-11.88	QP
6	946.98	4.84	26.86	2.56	34.26	46.00	-11.74	QP

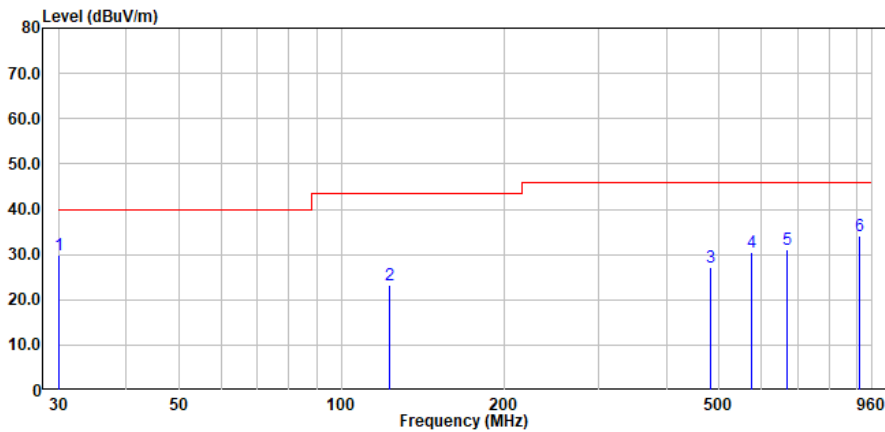
Notes: Emission Level = Read Level +Antenna Factor + Cable loss



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Mode: a; Polarization: Vertical; Channel: 5



Antenna Polarity :Vertical

	Freq (MHz)	Read level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	30.00	4.48	25.04	0.29	29.81	40.00	-10.19	QP
2	123.00	3.68	18.48	0.97	23.13	43.50	-20.37	QP
3	481.98	2.00	23.22	2.05	27.27	46.00	-18.73	QP
4	574.05	3.52	24.72	2.32	30.56	46.00	-15.44	QP
5	668.91	3.78	24.99	2.42	31.19	46.00	-14.81	QP
6	912.57	4.99	26.66	2.52	34.17	46.00	-11.83	QP

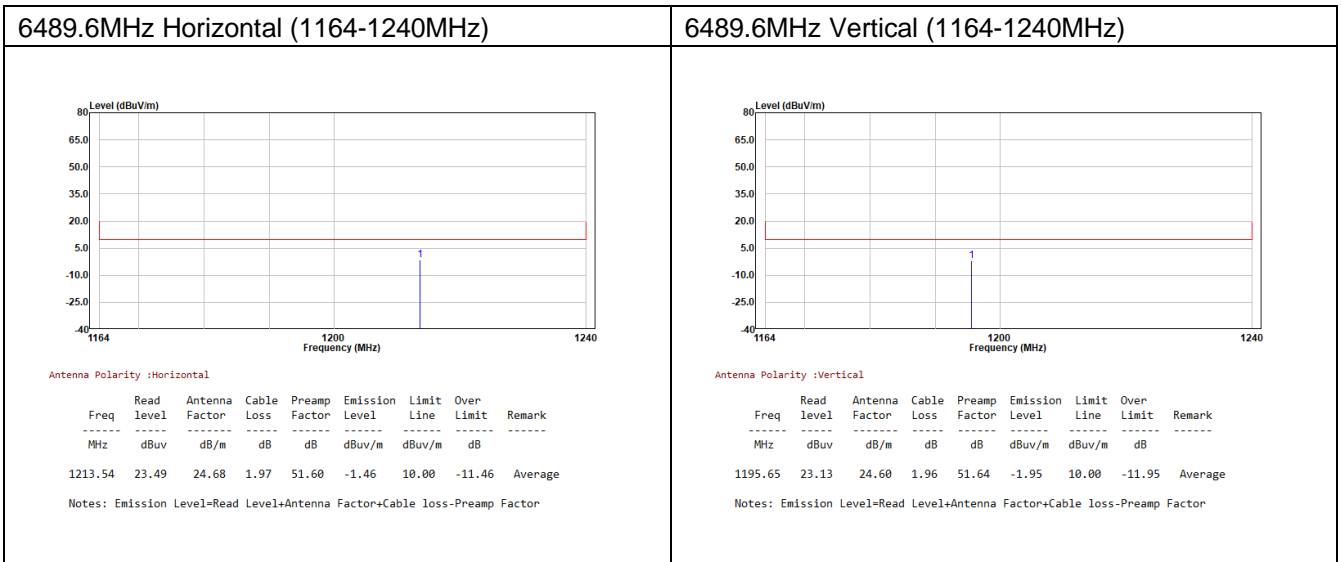
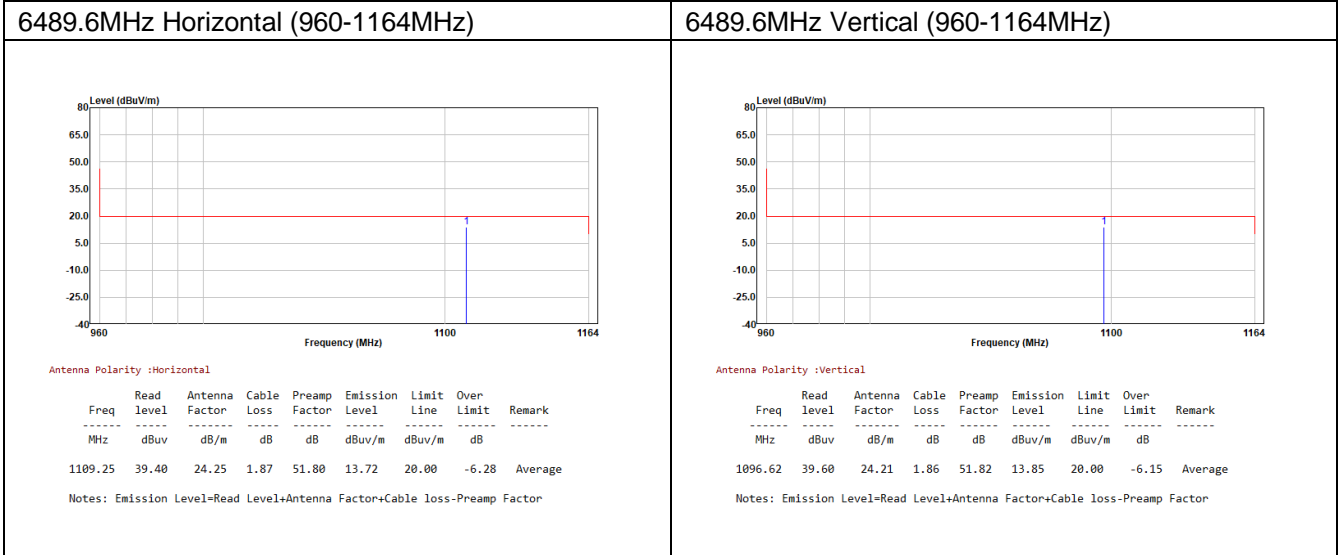
Notes: Emission Level = Read Level +Antenna Factor + Cable loss



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**Above 960MHz:  
Test Data For FCC**

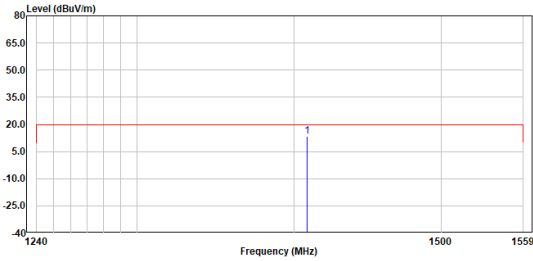


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### 6489.6MHz Horizontal (1240-1559MHz)

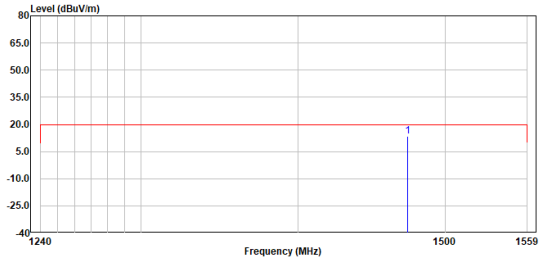


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1488.63	37.57	25.21	2.06	51.24	13.60	20.00	-6.40	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 6489.6MHz Vertical (1240-1559MHz)

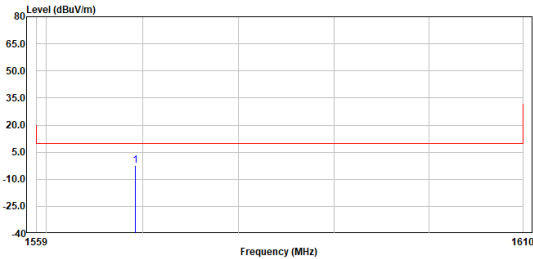


Antenna Polarity :Vertical

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1473.64	37.52	25.14	2.07	51.12	13.61	20.00	-6.39	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 6489.6MHz Horizontal (1559-1610MHz)

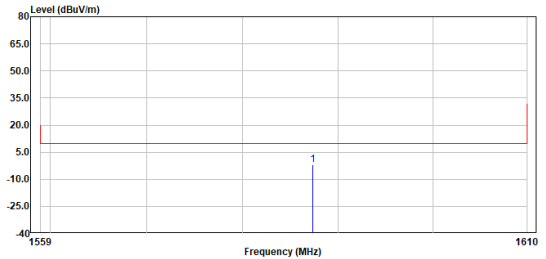


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1569.27	21.32	24.92	2.18	51.00	-2.58	10.00	-12.58	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 6489.6MHz Vertical (1559-1610MHz)



Antenna Polarity :Vertical

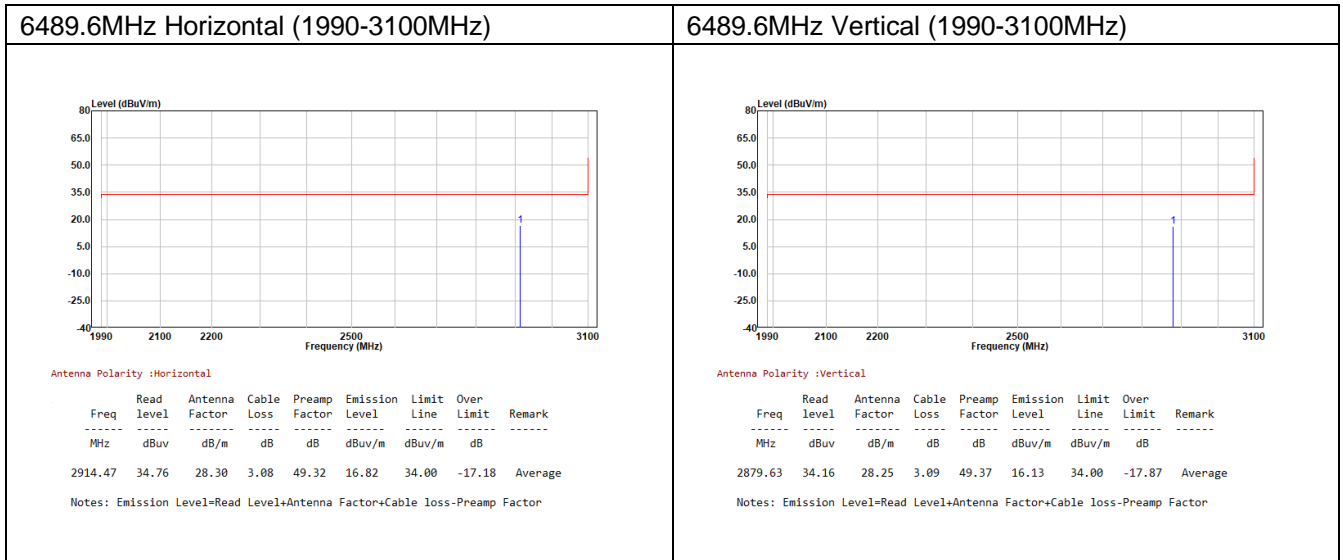
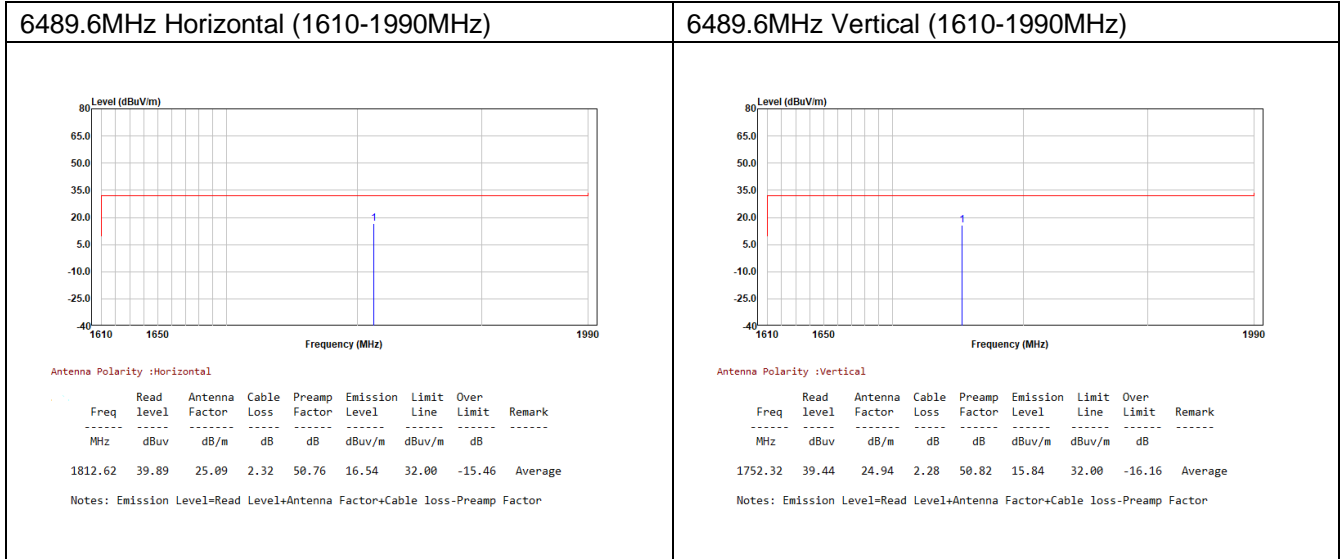
Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1587.38	21.97	24.88	2.20	50.98	-1.93	10.00	-11.93	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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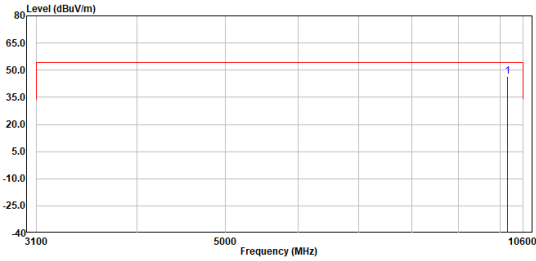
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### 6489.6MHz Horizontal (3100-10600MHz)

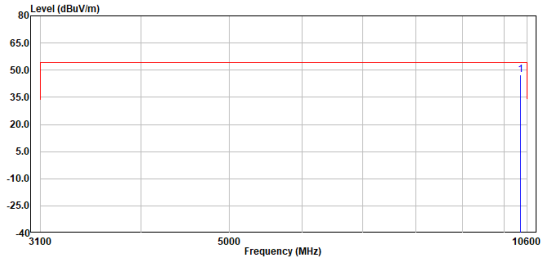


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
10192.21	47.64	38.79	5.99	45.85	46.57	54.00	-7.43	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 6489.6MHz Vertical (3100-10600MHz)

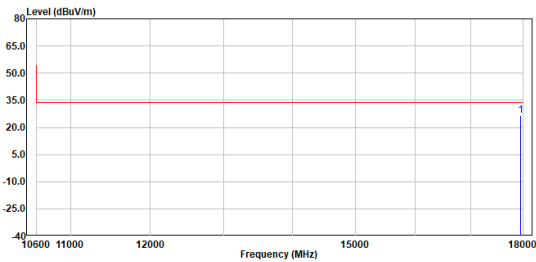


Antenna Polarity :Vertical

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
10431.60	47.77	39.04	6.14	45.67	47.28	54.00	-6.72	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 6489.6MHz Horizontal (10600-18000MHz)

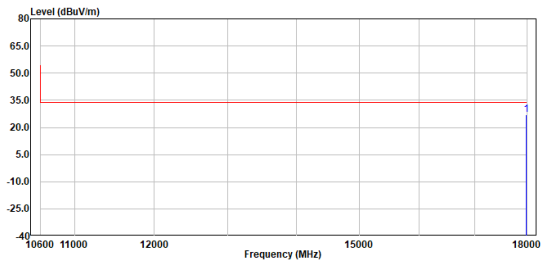


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
17950.70	15.16	45.54	10.45	44.37	26.78	34.00	-7.22	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 6489.6MHz Horizontal (10600-18000MHz)



Antenna Polarity :Vertical

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
17984.60	15.11	45.84	10.59	44.47	27.07	34.00	-6.93	Average

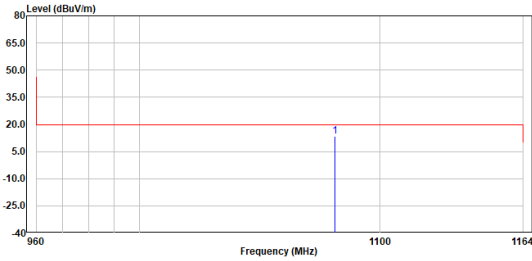
Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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### 7897.2MHz Horizontal (960-1164MHz)

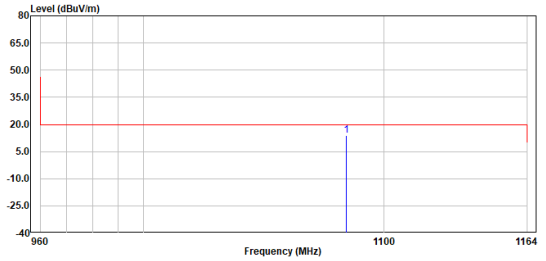


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1080.54	39.48	24.18	1.83	51.85	13.64	20.00	-6.36	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor

### 7897.2MHz Vertical (960-1164MHz)

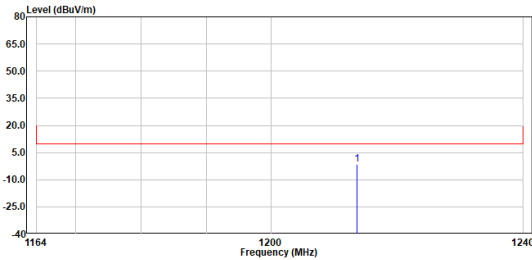


Antenna Polarity :Vertical

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1083.46	39.77	24.19	1.84	51.84	13.96	20.00	-6.04	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor

### 7897.2MHz Horizontal (1164-1240MHz)

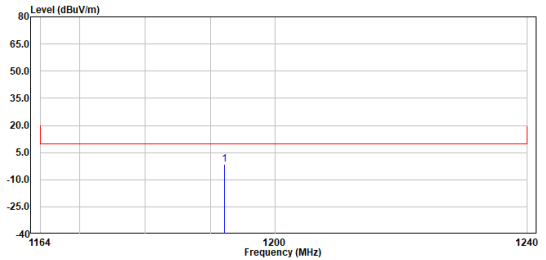


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1213.54	23.39	24.68	1.97	51.60	-1.56	10.00	-11.56	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor

### 7897.2MHz Vertical (1164-1240MHz)



Antenna Polarity :Vertical

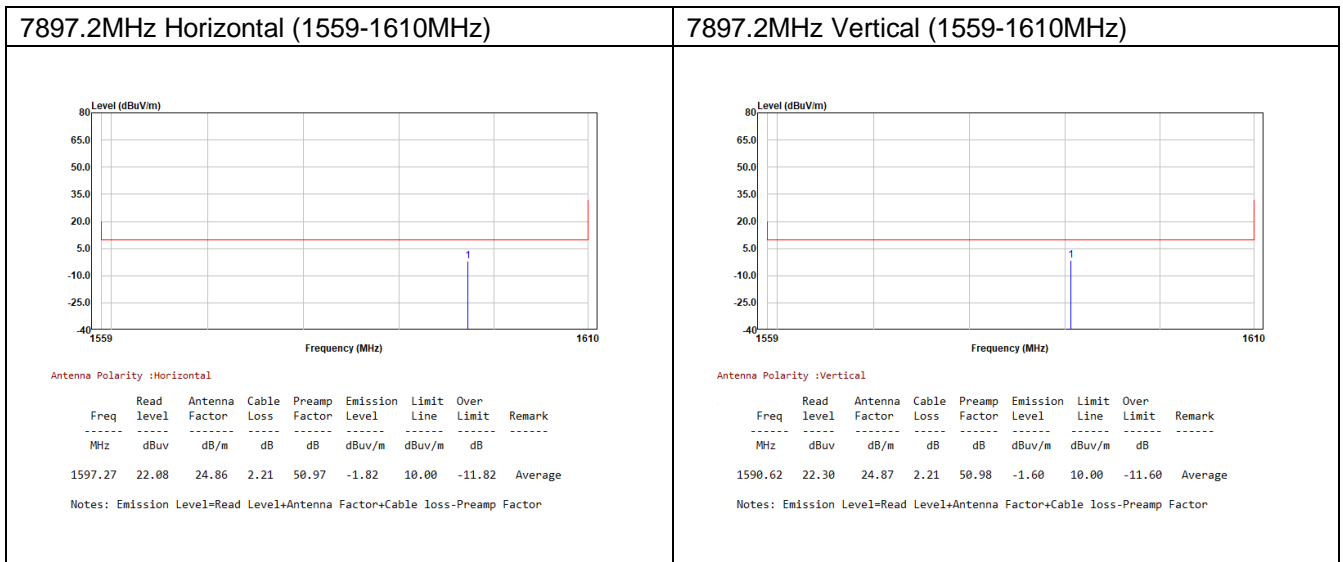
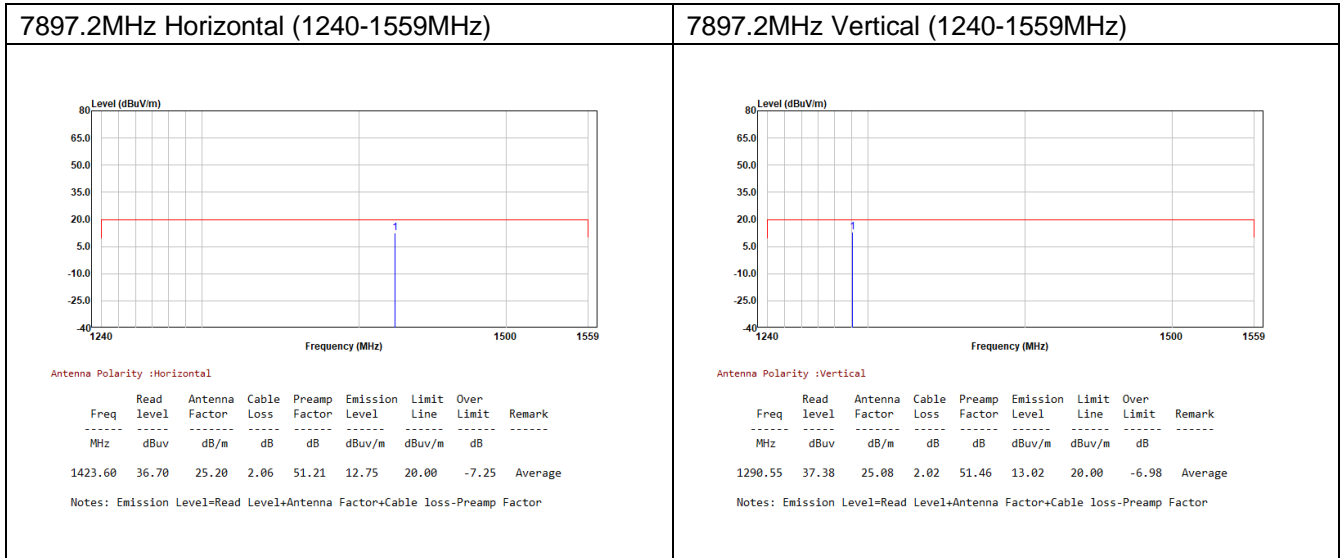
Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1192.20	23.80	24.59	1.95	51.64	-1.30	10.00	-11.30	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor



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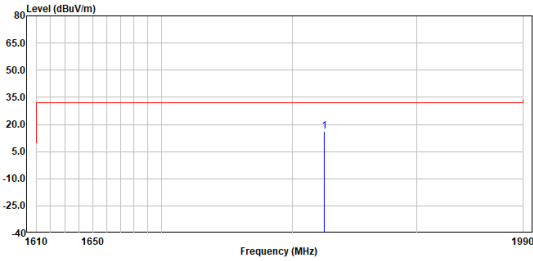
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### 7897.2MHz Horizontal (1610-1990MHz)

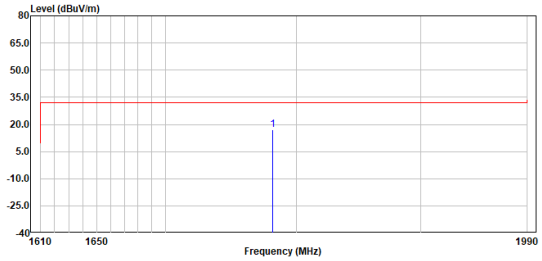


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1825.31	39.42	25.13	2.32	50.75	16.12	32.00	-15.88	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor

### 7897.2MHz Vertical (1610-1990MHz)

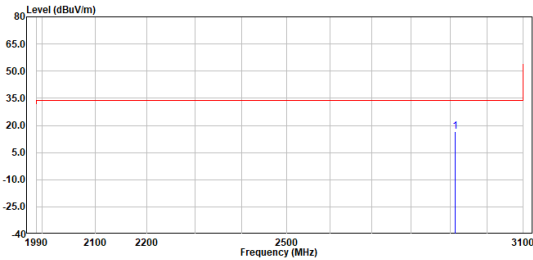


Antenna Polarity :Vertical

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
1781.20	40.54	24.98	2.30	50.79	17.03	32.00	-14.97	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor

### 7897.2MHz Horizontal (1990-3100MHz)

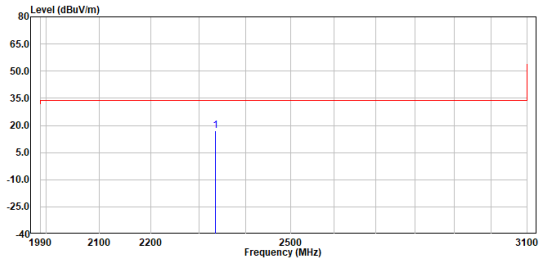


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2913.54	34.76	28.30	3.08	49.32	16.82	34.00	-17.18	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor

### 7897.2MHz Vertical (1990-3100MHz)



Antenna Polarity :Vertical

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
2334.39	37.10	27.51	2.64	50.20	17.05	34.00	-16.95	Average

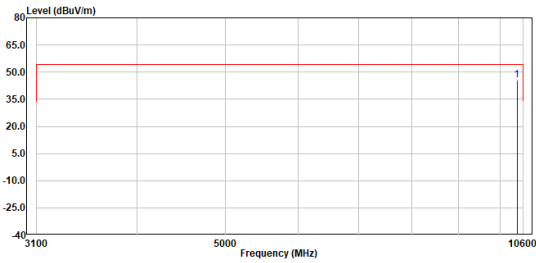
Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor



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### 7897.2MHz Horizontal (3100-10600MHz)

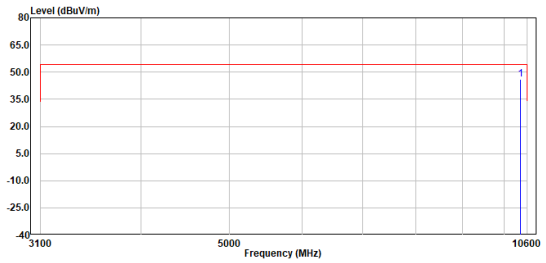


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
10435.62	46.15	39.05	6.14	45.67	45.67	54.00	-8.33	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 7897.2MHz Vertical (3100-10600MHz)

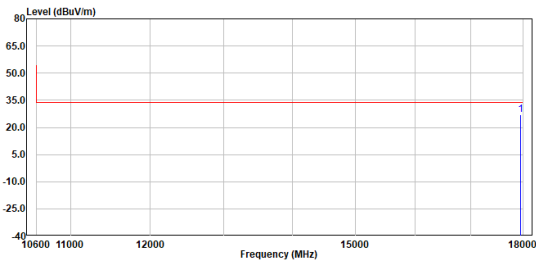


Antenna Polarity :Vertical

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
10421.90	46.73	39.03	6.14	45.68	46.22	54.00	-7.78	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 7897.2MHz Horizontal (10600-18000MHz)

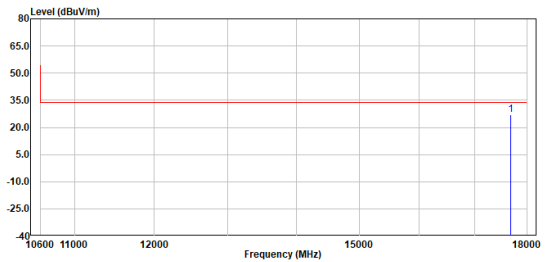


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
17958.30	15.40	45.61	10.48	44.39	27.10	34.00	-6.90	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 7897.2MHz Horizontal (10600-18000MHz)



Antenna Polarity :Vertical

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
17680.37	18.20	43.16	9.27	43.68	26.95	34.00	-7.05	Average

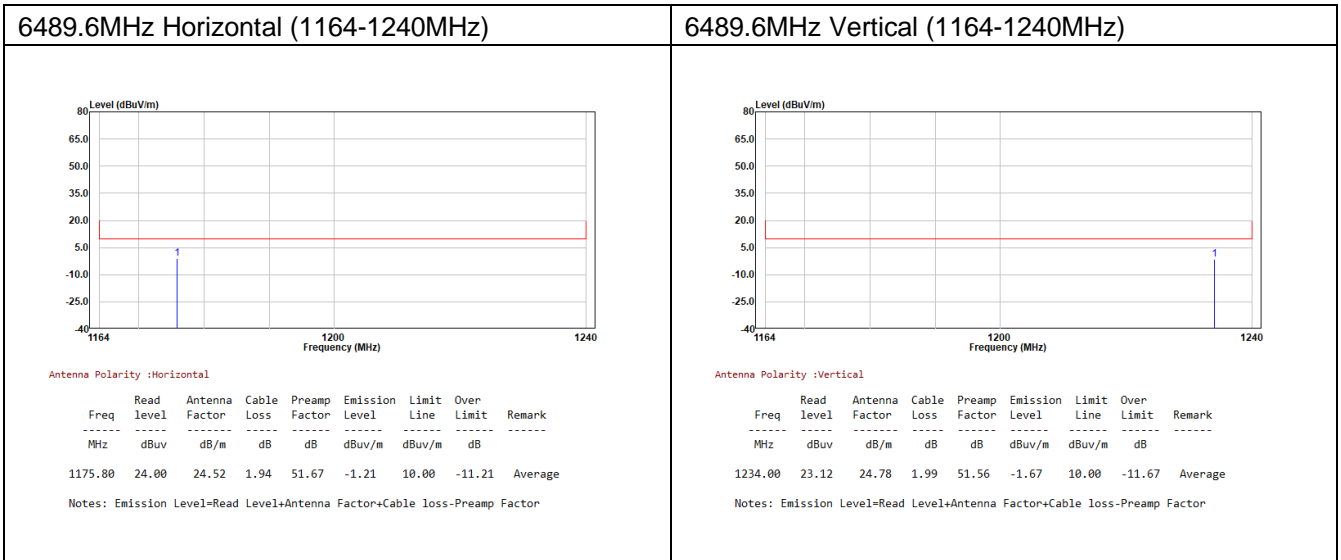
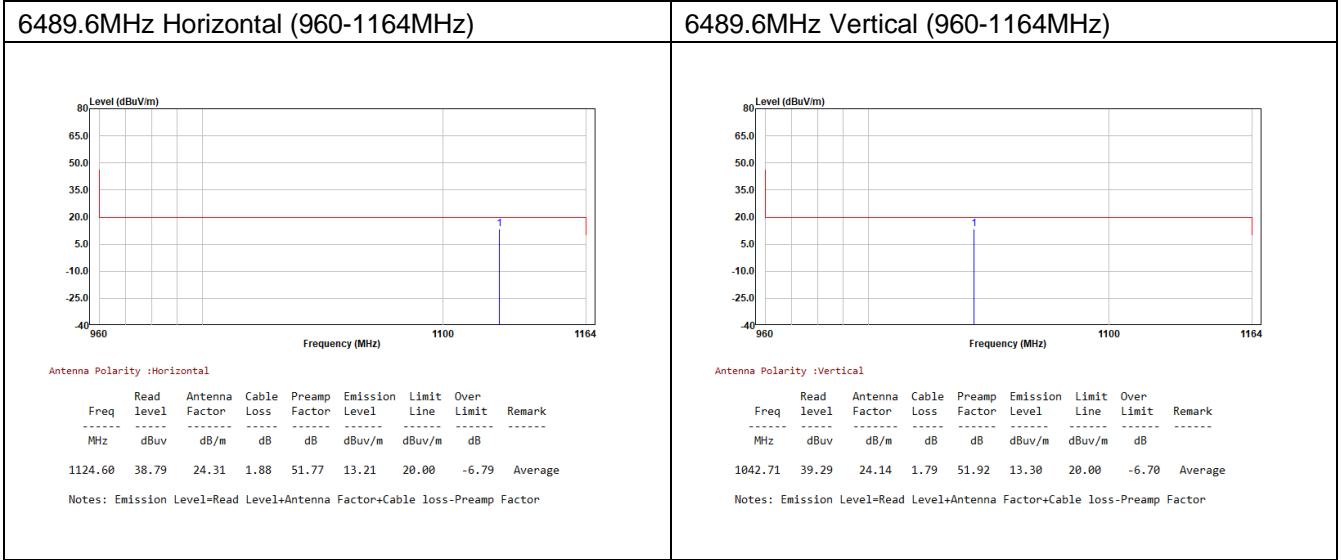
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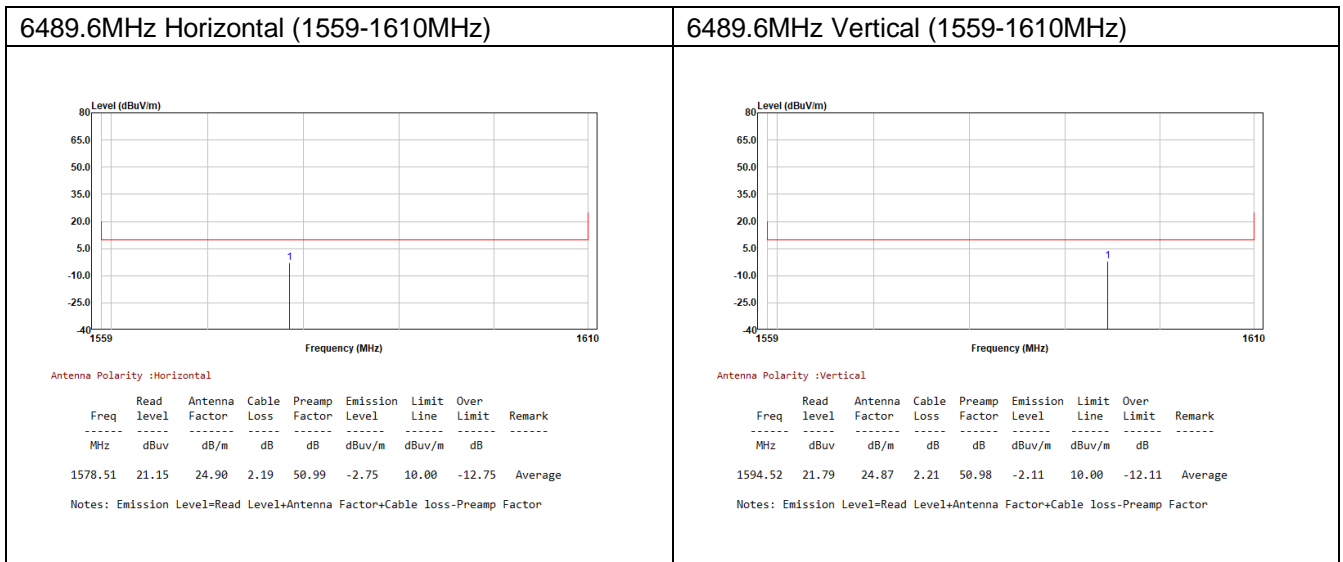
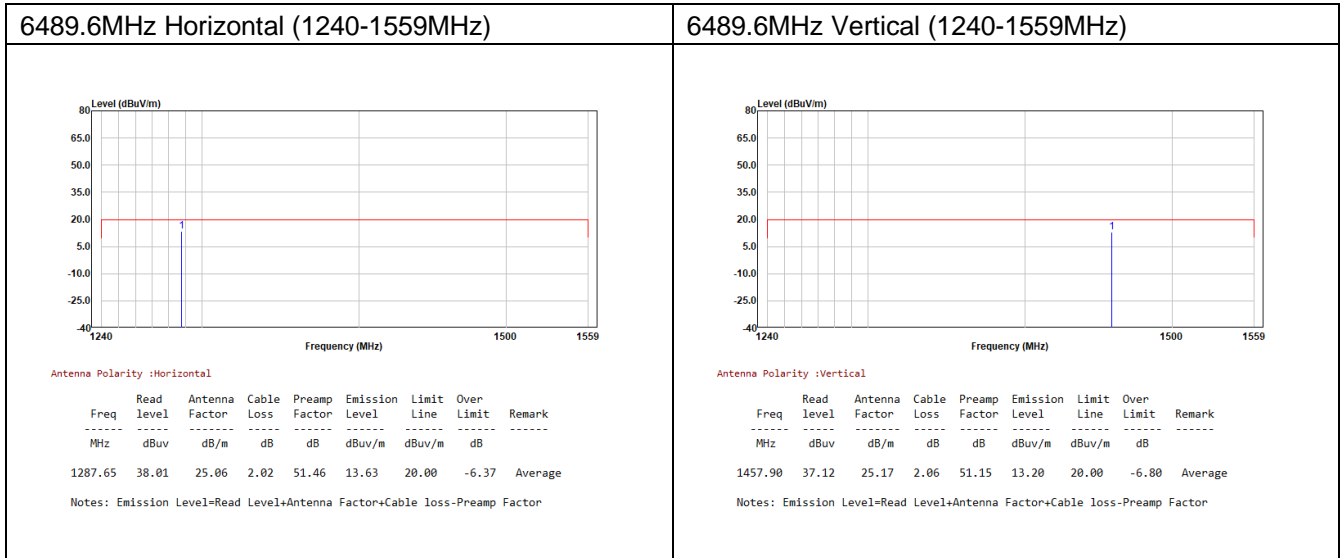
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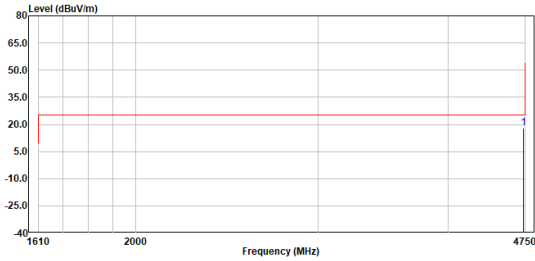




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### 6489.6MHz Horizontal (1610-4750MHz)

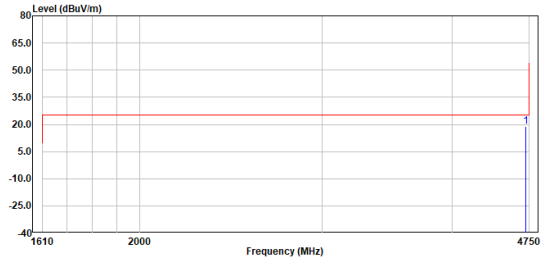


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4729.50	30.79	31.11	4.10	47.86	18.14	25.30	-7.16	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor

### 6489.6MHz Vertical (1610-4750MHz)

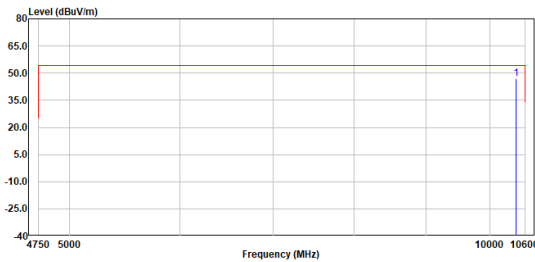


Antenna Polarity :Vertical

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
4715.25	31.70	31.08	4.09	47.87	19.00	25.30	-6.30	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor

### 6489.6MHz Horizontal (4750-10600MHz)

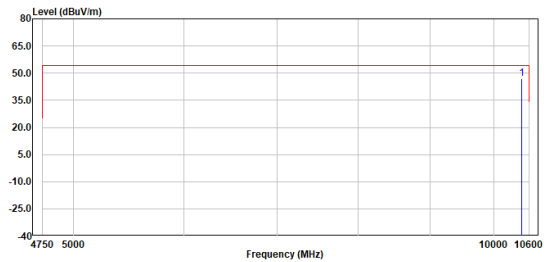


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
10438.00	47.27	39.05	6.15	45.67	46.80	54.00	-7.20	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor

### 6489.6MHz Vertical (4750-10600MHz)



Antenna Polarity :Vertical

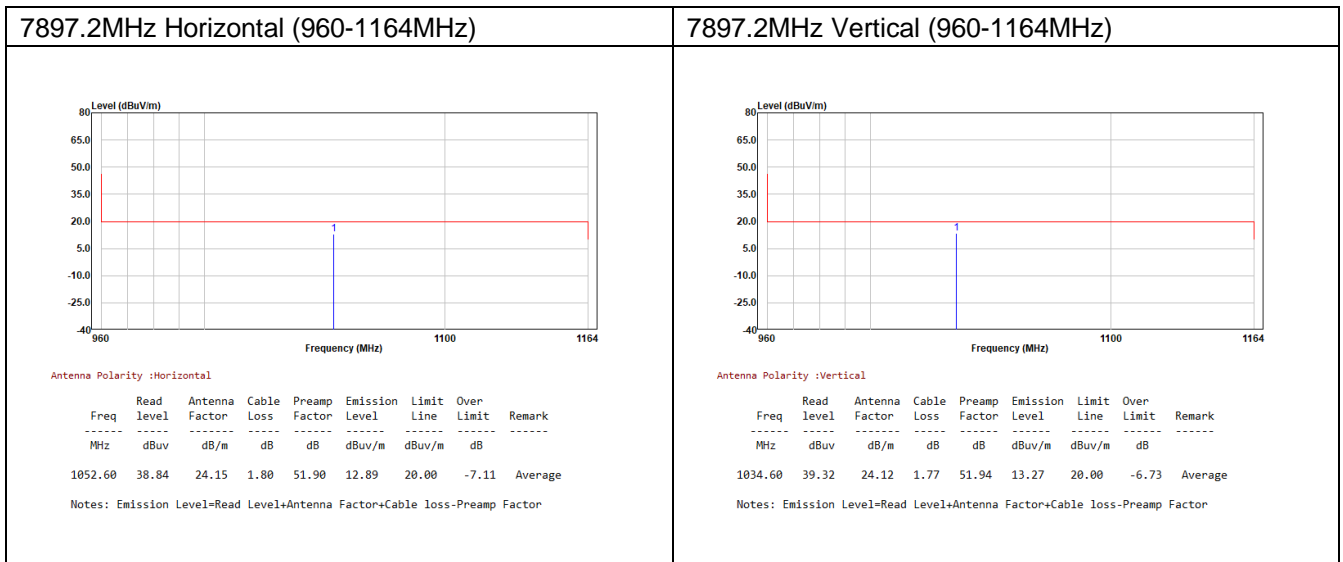
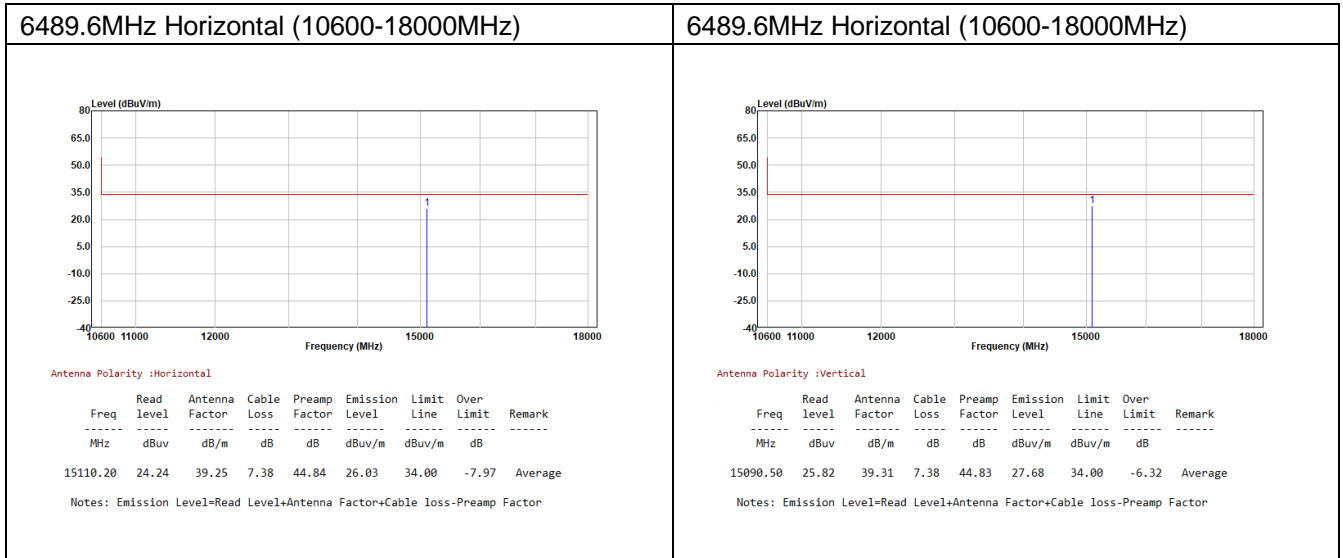
Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
10472.50	47.41	39.08	6.17	45.64	47.02	54.00	-6.98	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable Loss-Preamp Factor



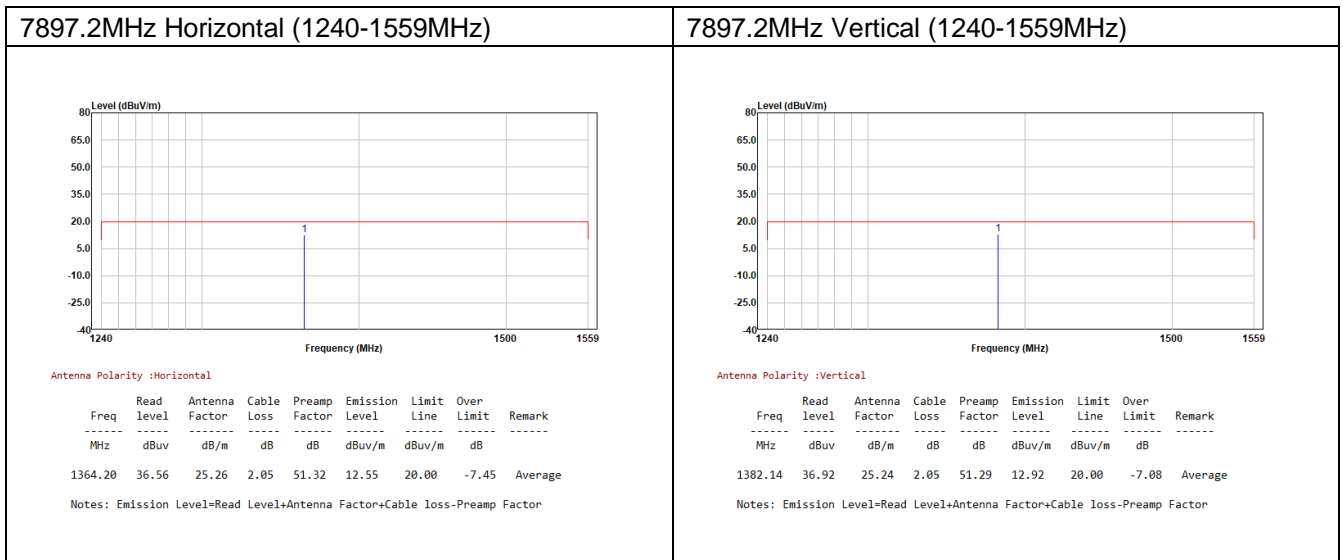
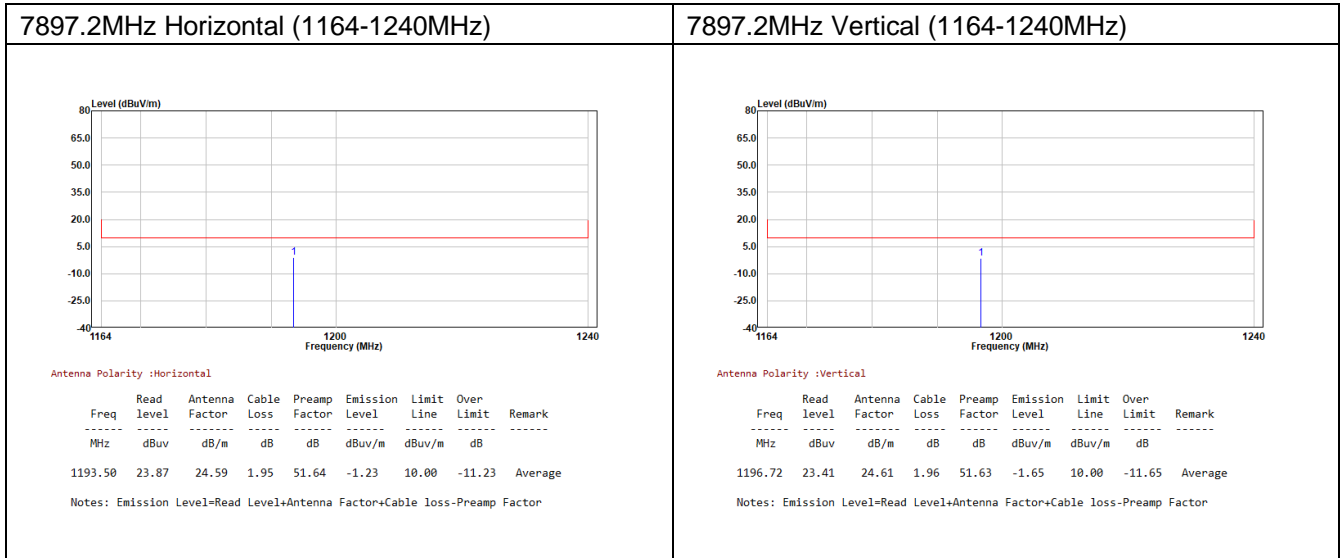
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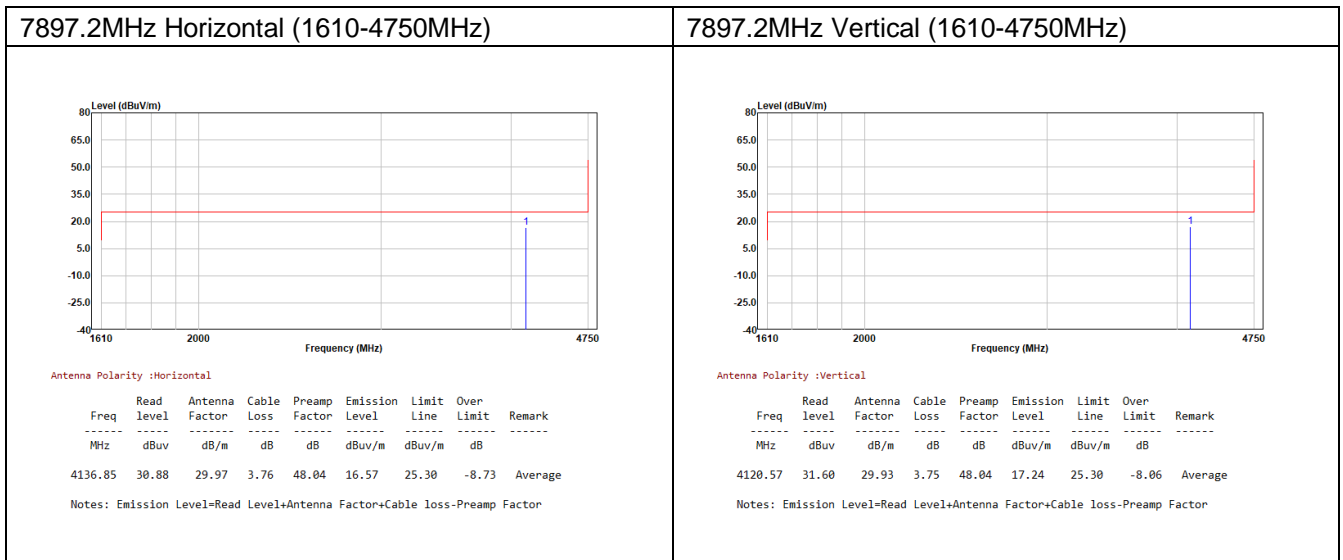
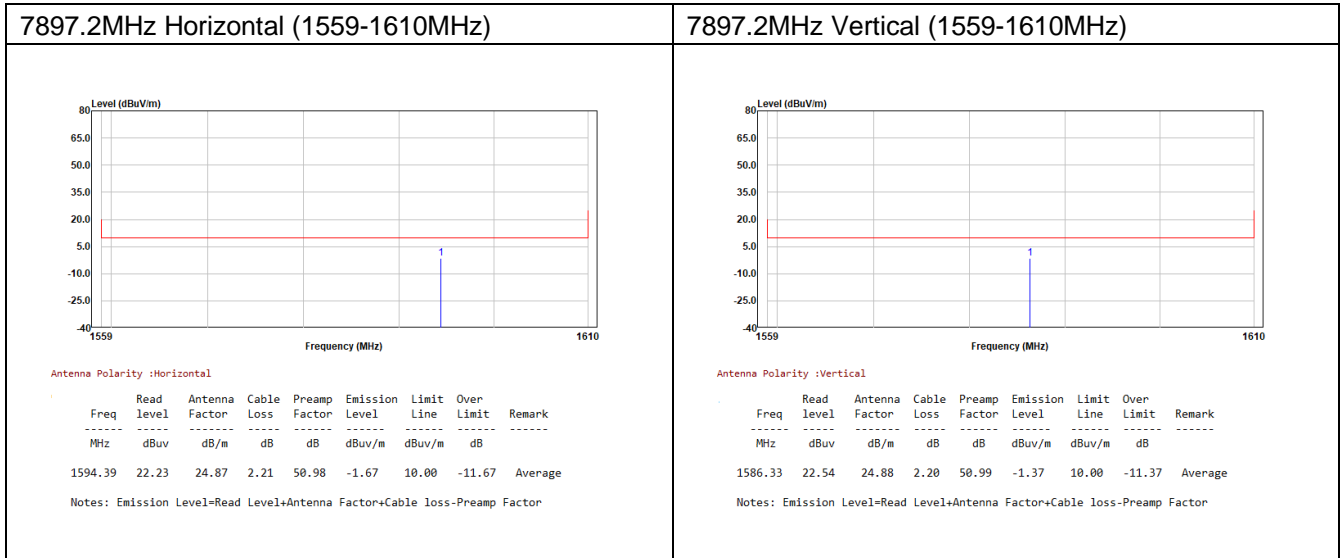
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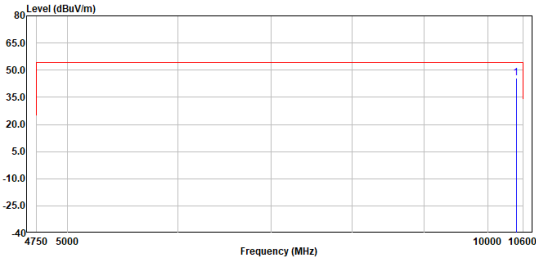
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### 7897.2MHz Horizontal (4750-10600MHz)

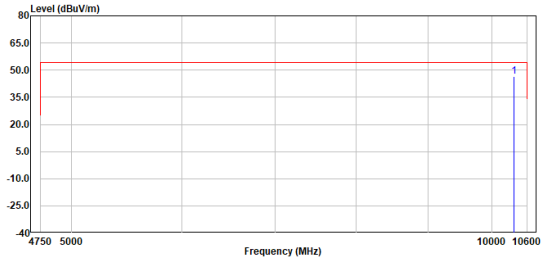


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
10478.10	46.10	39.09	6.17	45.64	45.72	54.00	-8.28	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 7897.2MHz Vertical (4750-10600MHz)

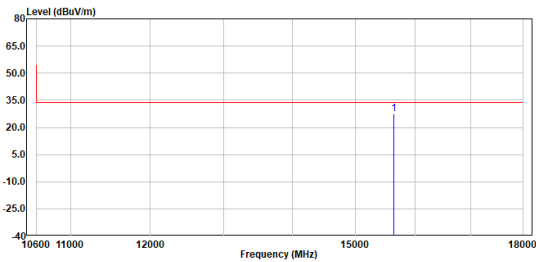


Antenna Polarity :Vertical

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
10367.80	47.21	38.98	6.10	45.72	46.57	54.00	-7.43	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 7897.2MHz Horizontal (10600-18000MHz)

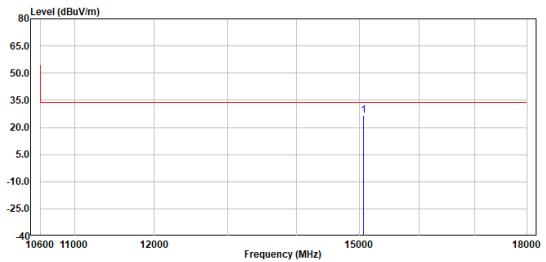


Antenna Polarity :Horizontal

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
15642.50	27.19	37.67	7.45	44.98	27.33	34.00	-6.67	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 7897.2MHz Horizontal (10600-18000MHz)



Antenna Polarity :Vertical

Read Freq	Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
MHz	dBuv	dB/m	dB	dB	dBuv/m	dBuv/m	dB	
15065.30	24.86	39.38	7.37	44.82	26.79	34.00	-7.21	Average

Notes: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



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### 8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SHCR2308001590AT

### 9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for SHCR2308001590AT

- End of the Report -



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