



# Global United Technology Services Co., Ltd.

Report No.: GTS2023090265F01

# **TEST REPORT**

Applicant: SCR Engineers Ltd.

Address of Applicant: 18 Hamelacha street, Poleg Industrial Zone 8310, Netanya,

4250553, Israel

Manufacturer: SCR Engineers Ltd.

Address of 18 Hamelacha street, Poleg Industrial Zone 8310, Netanya,

Manufacturer: 4250553, Israel

**Equipment Under Test (EUT)** 

Product Name: DeLaval milkmeter MM

Model No.: MM100

Trade Mark: DeLaval

FCC ID: AMUMM300

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: September 27, 2023

Date of Test: September 27, 2023-October 18, 2023

Date of report issued: October 18, 2023

Test Result: PASS \*

Authorized Signature:





**Laboratory Manager** 

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.





# 2 Version

Version No.	Date	Description		
00	October 18, 2023	Original		

Prepared By:	Tramellu	Date:	October 18, 2023
	Project Engineer		
Check By:	Reviewer	Date:	October 18, 2023



# 3 Contents

			age
1	cov	ER PAGE	1
2	VER	SION	2
3	CON	TENTS	3
4		T SUMMARY	
5	GEN	ERAL INFORMATION	
	5.1	GENERAL DESCRIPTION OF EUT	5
	5.2	TEST MODE	
	5.3	DESCRIPTION OF SUPPORT UNITS	7
	5.4	DEVIATION FROM STANDARDS	
	5.5	ABNORMALITIES FROM STANDARD CONDITIONS	7
	5.6	TEST FACILITY	
	5.7	TEST LOCATION	
	5.8	Additional Instructions	
6	TES	T INSTRUMENTS LIST	8
7	TES	T RESULTS AND MEASUREMENT DATA	10
	7.1	ANTENNA REQUIREMENT	10
	7.1	CONDUCTED EMISSIONS	
	7.3	Spurious Emission in Non-restricted & restricted Bands	
	7.3.1		
8	TES	T SETUP PHOTO	29
9	CHT	CONSTRUCTIONAL DETAILS	20
J	EUI	CONSTRUCTIONAL DETAILS	29





### 4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Output Power	15.247 (b)(3)	N/A
Channel Bandwidth	15.247 (a)(2)	N/A
Power Spectral Density	15.247 (e)	N/A
Band Edge	15.247(d)	N/A
Spurious Emission	15.205/15.209	Pass

### Remarks:

- 1. Pass: The EUT complies with the essential requirements in the standard.
- 2. N/A: Not applicable. This's a Class II permissive change report, all of the changes are not effect to the RF performance, function and power. So the RF conducted test data directly reference the original report number GTS2023020111F01.
- 3. Test according to ANSI C63.10

### **Measurement Uncertainty**

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz-30MHz	3.1dB	(1)
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)
Note (1): The measurement unce	ertainty is for coverage factor of k	=2 and a level of confidence of	95%.





### 5 General Information

### 5.1 General Description of EUT

Product Name:	DeLaval milkmeter MM
Model No.:	MM100
Test sample(s) ID:	GTS2023090265-1
Sample(s) Status:	Engineer sample
S/N:	N/A
Operation Frequency:	2402MHz~2480MHz
Channel Numbers:	40
Channel Separation:	2MHz
Modulation Type:	GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	2.65dBi
Power Supply:	DC 24V

### Note:

- 1. Antenna gain information provided by the customer.
- 2. The relevant information of the sample is provided by the entrusting company, and the laboratory is not responsible for its authenticity.



Operation F	Operation Frequency each of channel						
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402 MHz	11	2422 MHz	21	2442 MHz	31	2462 MHz
2	2404 MHz	12	2424 MHz	22	2444 MHz	32	2464 MHz
3	2406 MHz	13	2426 MHz	23	2446 MHz	33	2466 MHz
4	2408 MHz	14	2428 MHz	24	2448 MHz	34	2468 MHz
5	2410 MHz	15	2430 MHz	25	2450 MHz	35	2470 MHz
6	2412 MHz	16	2432 MHz	26	2452 MHz	36	2472 MHz
7	2414 MHz	17	2434 MHz	27	2454 MHz	37	2474 MHz
8	2416 MHz	18	2436 MHz	28	2456 MHz	38	2476 MHz
9	2418 MHz	19	2438 MHz	29	2458 MHz	39	2478 MHz
10	2420 MHz	20	2440 MHz	30	2460 MHz	40	2480 MHz

### Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz





#### 5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
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### 5.3 Description of Support Units

Manufacturer		Description	Model	Serial Number
	AELTA	DC POWER SUPPLY	NEC CLASS2	N/A

### 5.4 Deviation from Standards

None.

### 5.5 Abnormalities from Standard Conditions

None.

### 5.6 Test Facility

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

• FCC—Registration No.: 381383

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files.

• IC —Registration No.: 9079A

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

NVLAP (LAB CODE:600179-0)

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

### 5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480 Fax: 0755-27798960

#### 5.8 Additional Instructions

Test Software	Special test software provided by manufacturer
Power level setup	Default





# 6 Test Instruments list

Rad	Radiated Emission:								
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)			
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	June 23, 2021	June 22, 2024			
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A			
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April 14, 2023	April 13, 2024			
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 19, 2023	March 18, 2025			
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	April 17, 2023	April 16, 2025			
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A			
7	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 14, 2023	April 13, 2024			
8	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 29, 2022	Nov. 28, 2023			
9	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 14, 2023	April 13, 2024			
10	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 14, 2023	April 13, 2024			
11	Horn Antenna (18- 26.5GHz)	1	UG-598A/U	GTS664	Oct. 30, 2022	Oct. 29, 2023			
12	Horn Antenna (26.5-40GHz)	A.H Systems	SAS-573	GTS665	Oct. 30, 2022	Oct. 29, 2023			
13	FSV-Signal Analyzer (10Hz- 40GHz)	Keysight	FSV-40-N	GTS666	March 13, 2023	March 12, 2024			
14	Amplifier	1	LNA-1000-30S	GTS650	April 14, 2023	April 13, 2024			
15	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS668	Dec. 20, 2022	Dec.19, 2023			
16	Wideband Amplifier		WDA-01004000-15P35	GTS602	April 14, 2023	April 13, 2024			
17	Thermo meter	JINCHUANG	GSP-8A	GTS643	April 19, 2023	April 18, 2024			
18	RE cable 1	GTS	N/A	GTS675	July 31. 2023	July 30. 2024			
19	RE cable 2	GTS	N/A	GTS676	July 31. 2023	July 30. 2024			
20	RE cable 3	GTS	N/A	GTS677	July 31. 2023	July 30. 2024			
21	RE cable 4	GTS	N/A	GTS678	July 31. 2023	July 30. 2024			
22	RE cable 5	GTS	N/A	GTS679	July 31. 2023	July 30. 2024			
23	RE cable 6	GTS	N/A	GTS680	July 31. 2023	July 30. 2024			
24	RE cable 7	GTS	N/A	GTS681	July 31. 2023	July 30. 2024			
25 RE cable 8 GTS		GTS	N/A	GTS682	July 31. 2023	July 30. 2024			



Con	Conducted Emission							
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	July 12, 2022	July 11, 2027		
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 14, 2023	April 13, 2024		
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	April 14, 2023	April 13, 2024		
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A		
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A		
6	Thermo meter	JINCHUANG	GSP-8A	GTS642	April 19, 2023	April 18, 2024		
7	Absorbing clamp	Elektronik- Feinmechanik	MDS21	GTS229	April 14, 2023	April 13, 2024		
8	ISN	SCHWARZBECK	NTFM 8158	GTS565	April 14, 2023	April 13, 2024		
9	High voltage probe	SCHWARZBECK	TK9420	GTS537	April 14, 2023	April 13, 2024		
10	Antenna end assembly	Weinschel	1870A	GTS560	April 14, 2023	April 13, 2024		

Ger	neral used equipment:					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	KUMAO	SF132	GTS647	April 19, 2023	April 18, 2024





### 7 Test results and Measurement Data

### 7.1 Antenna requirement

**Standard requirement:** FCC Part15 C Section 15.203 /247(c)

### 15.203 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.

### 15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

### **E.U.T Antenna:**

The antenna is PCB antenna, reference to the appendix II for details





### 7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, St	weep time=auto				
Limit:	Fragues ou range (MHz)	Limit	(dBuV)			
	Frequency range (MHz)	Quasi-peak	Avei			
	0.15-0.5	66 to 56*	56 to			
	0.5-5	56	4			
	5-30 * Decreases with the logarithm	60	5	0		
Test setup:	Reference Plane					
Test procedure:	AUX Equipment E.U.T  Test table/Insulation plane  Remark E.U.T. Equipment Under Test LISN Line Impedence Stabilization Network Test table height=0.8m	Filter — AC p		through a		
root prooduito.	<ol> <li>The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2009 on conducted measurement.</li> </ol>					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.: 25 °C Hun		Press.:	1012mbar		
Test voltage:	AC 120V 60Hz					
Test results:	Pass					
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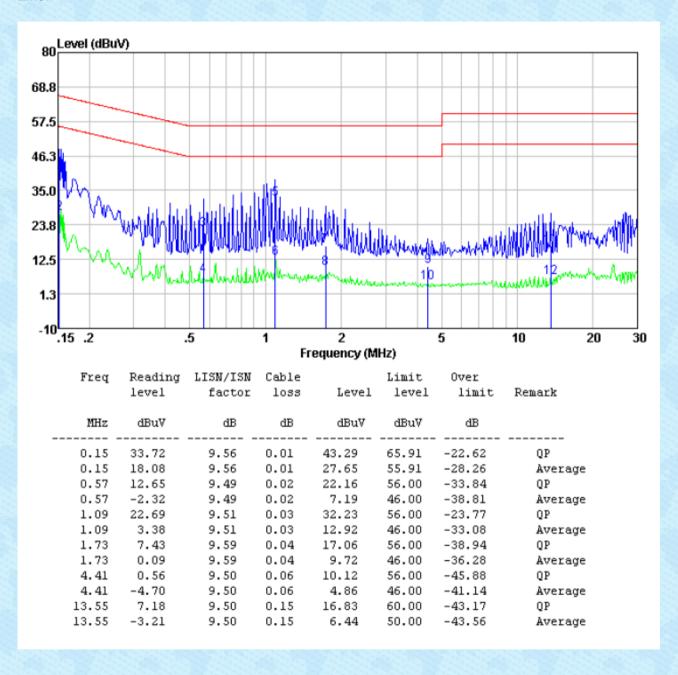




#### Measurement data

Pre-scan all test modes, found worst case at 2480MHz, and so only show the test result of 2480MHz,

#### Line:

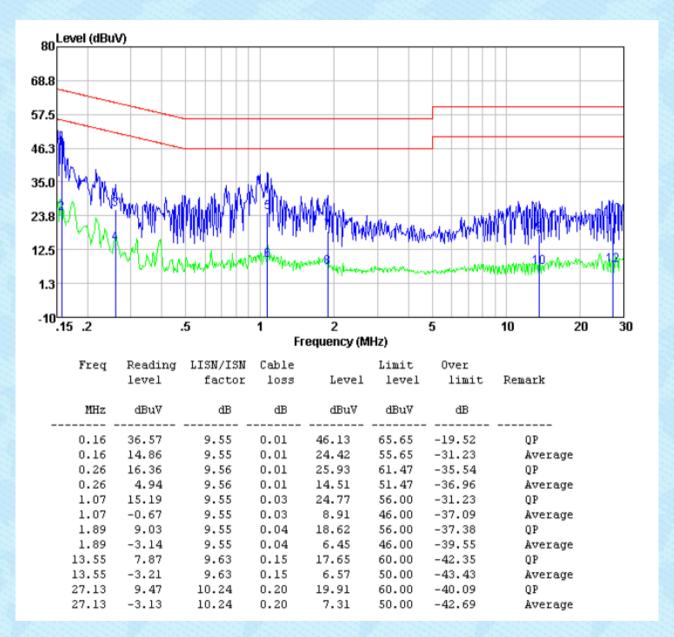




**GTS** 

Report No.: GTS2023090265F01

#### Neutral:



### Notes:

- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level =Receiver Read level + LISN Factor + Cable Loss
- 4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

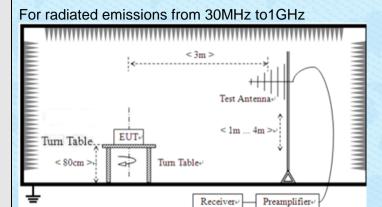


# 7.3 Spurious Emission in Non-restricted & restricted Bands

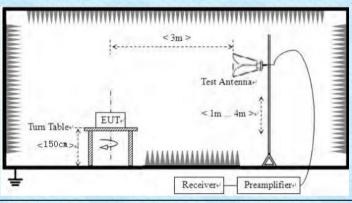
### 7.3.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209						
Test Method:	ANSI C63.10						
Test Frequency Range:	9kHz to 25GHz						
Test site:	Measurement Distar	nce: 3	3m				
Receiver setup:	Frequency		Detector	RBV	٧	VBW	Value
	9KHz-150KHz	Qı	uasi-peak	200H	Ιz	600Hz	Quasi-peak
	150KHz-30MHz	Qı	uasi-peak	9KH	lz	30KHz	Quasi-peak
	30MHz-1GHz	Qı	uasi-peak	120K	Hz	300KHz	Quasi-peak
	Above 1GHz		Peak	1MH	lz	3MHz	Peak
	7,5500 10112		Peak	1MH	lz	10Hz	Average
	Note: For Duty cycle $\geqslant$ 98%, average detector set as above For Duty cycle < 98%, average detector set as below: VBW $\geqslant$ 1 / T						
Limit:	Frequency		Limit (u\	//m)	V	/alue	Measurement Distance
	0.009MHz-0.490M	lHz	2400/F(k	(Hz)	QP.	/PK/AV	300m
	0.490MHz-1.705MHz 24000/F(KHz) QP 30m						
	1.705MHz-30MHz 30 QP 30				30m		
	30MHz-88MHz		100			QP	
	88MHz-216MHz	-	150			QP	
	216MHz-960MH	-	200			QP	3m
	960MHz-1GHz		500			QP	
	Above 1GHz		500			verage	
<del>-</del>			5000			Peak	
Test setup:	For radiated emiss	sions	from 9kH	z to 30	MHz	4	
	Tum Table Sum > Su		< 3m > Test A	ntenna lm Receiver			





For radiated emissions above 1GHz



#### Test Procedure:

- 1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 6. 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.

Test Instruments: Refer to section 6.0 for details

Test mode: Refer to section 5.2 for details





Report No.: GTS2023090265F01						90265F01
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V 60Hz					
Test results:	Pass					

### Measurement data:

Remark:

Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

### ■ 9kHz~30MHz

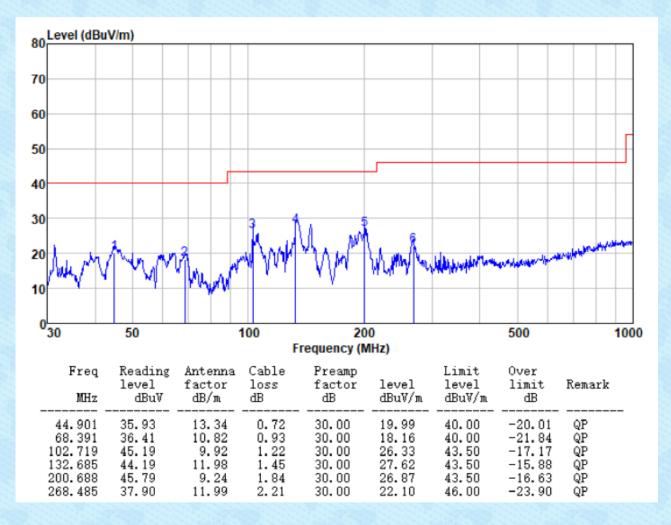
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.





### ■ Below 1GHz

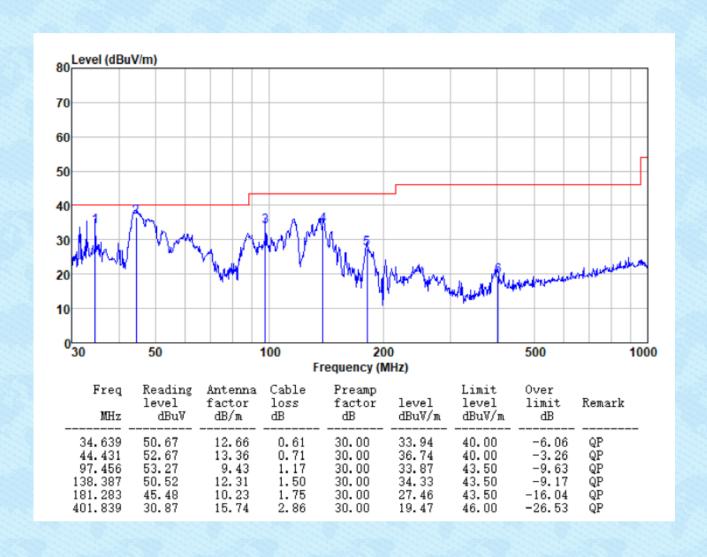
Pre-scan all test modes, found worst case at 2480MHz, and so only show the test result of 2480MHz **Horizontal:** 







### Vertical:



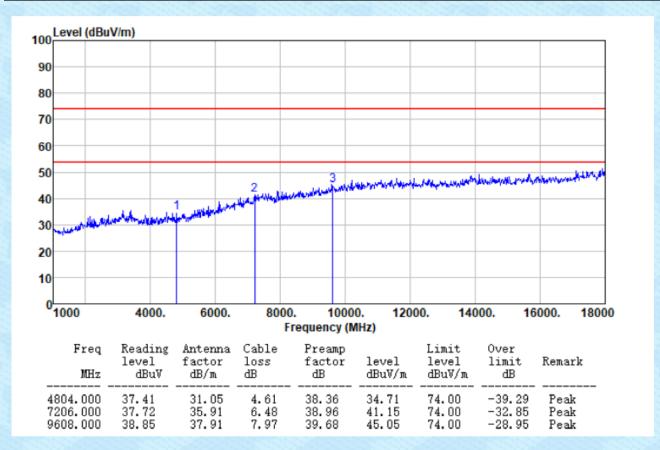




#### ■ Above 1GHz

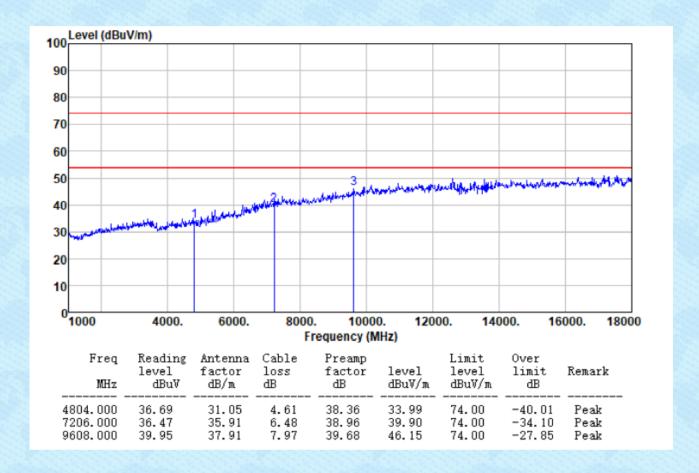
### ■ Unwanted Emissions in Non-Restricted Frequency Bands

Test channel: Lowest Polarization: Horizontal



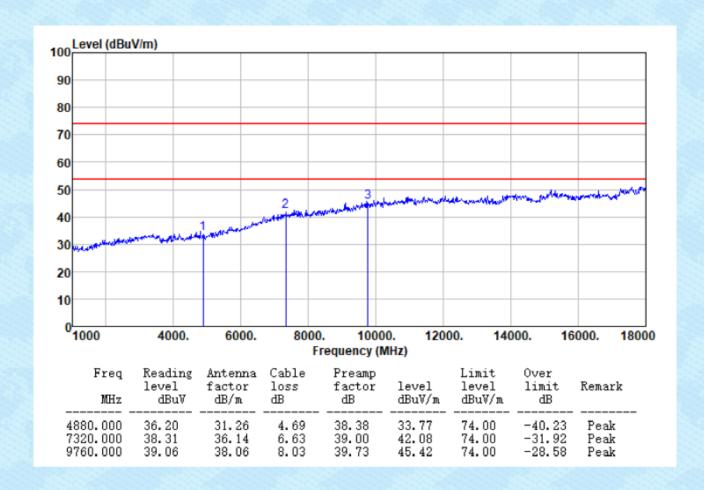


Test channel:   Lowest   Polarization:   Vertical
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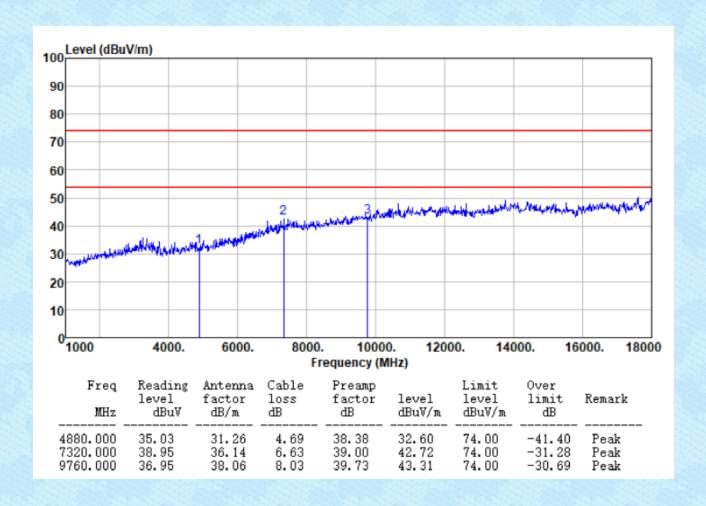


Test channel:	Middle	Polarization:	Horizontal
1 oot onarmon	madio	i olanzadom	i ionzontai





Test channel:   Middle   Polarization:   Vertical	Test channel:	Middle	Polarization:	Vertical
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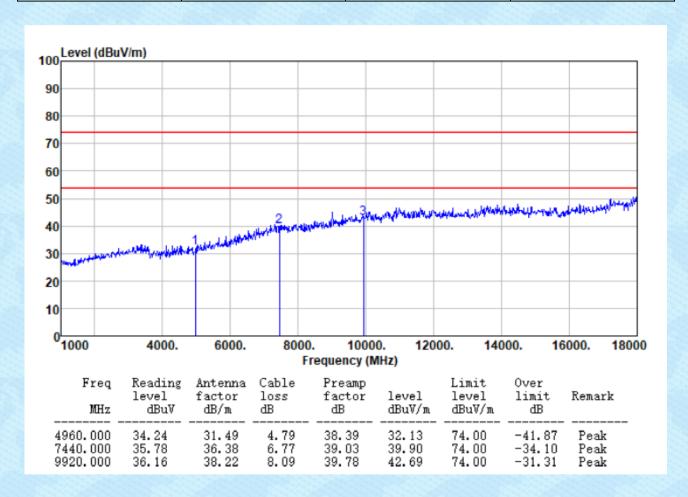


Test channel: Highest Polarization: Horizontal	Test channel:	Highest	Polarization:	Horizontal
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#### Vertical: 100 Level (dBuV/m) 90 80 70 60 THE RESIDENCE OF THE PROPERTY 50 40 30 20 10 1000 4000. 6000. 10000. 12000. 14000. 18000 8000. 16000. Frequency (MHz) Reading Cable 0ver Freq Antenna Preamp Limit level level factor loss factor level limit Remark MHzdBu∀ dB/π ďΒ ďΒ dBuV/m dBuV/m ďΒ 31.49 36.38 38.22 4.79 6.77 8.09 -40.12 -34.30 -28.60 4960.000 35.99 38.39 74.00 Peak 33.88 7440.000 9920.000 39.70 45.40 35.58 38.87 39.03 39.78 74.00 74.00 Peak Peak



Test channel:	Highest	Polarization:	Vertical
	g		



### Remarks:

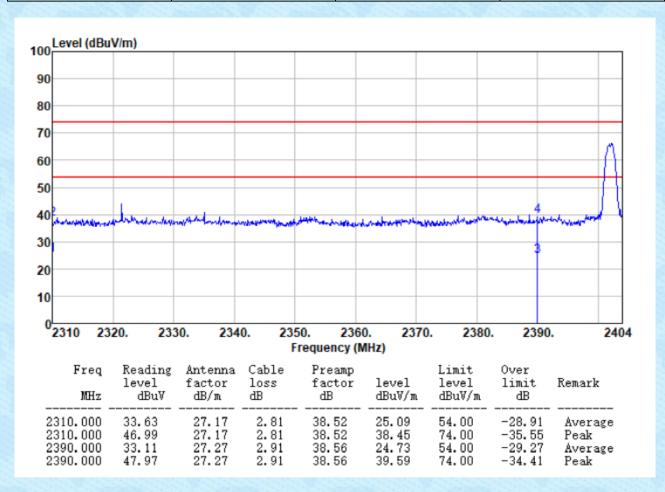
- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.





### ■ Unwanted Emissions in Restricted Frequency Bands

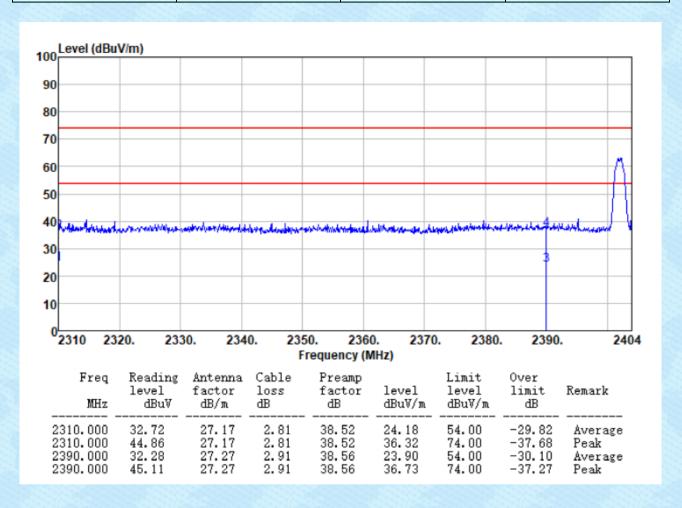
Test channel: Lowest Polarization: Horizontal	ontal
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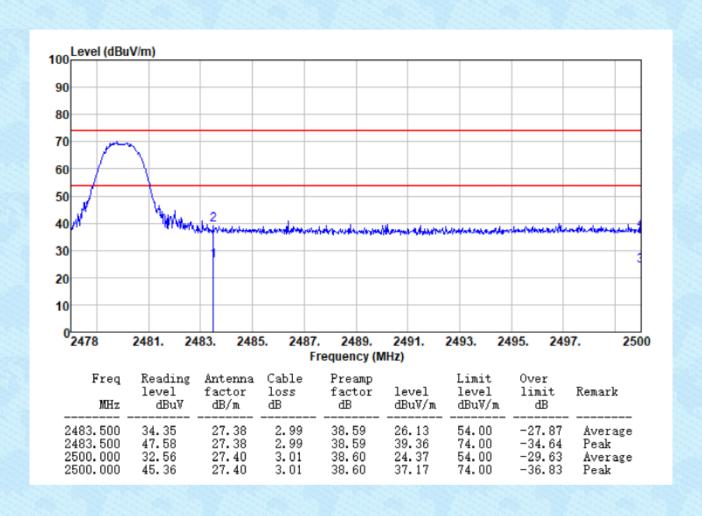


Test channel:	Lowest	Polarization:	Vertical



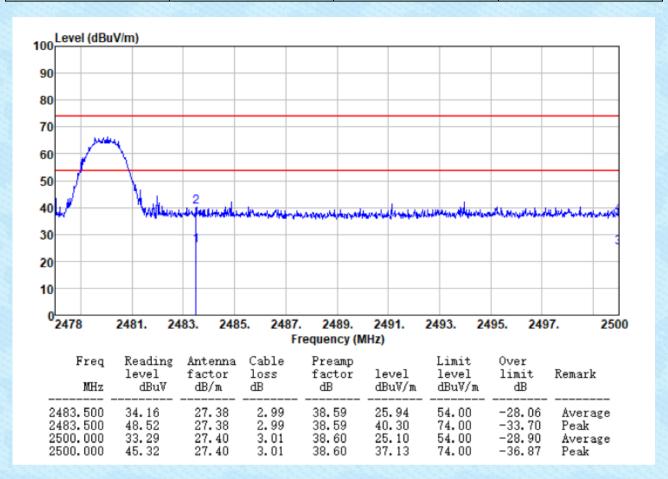


Toot obannali	Llighoot	Dolorization	Horizontal
l est channel:	Highest	Polarization:	Horizontal





	Test channel:	Highest	Polarization:	Vertical	
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### Remarks:

- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.





# 8 Test Setup Photo

Reference to the appendix I for details.

### 9 EUT Constructional Details

Reference to the appendix II for details.

-----End-----