

Prüfbericht-Nr.: <i>Test report no.:</i>	CN20VG18 001	Auftrags-Nr.: <i>Order no.:</i>	168289973	Seite 1 von 56 <i>Page 1 of 56</i>
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	27.11.2020	
Auftraggeber: <i>Client:</i>	DEHK LIMITED Rooms 305-6, 3rd floor, Hang Bong Commercial Centre, 28 Shanghai Street, Jordan, Kowloon, HK			
Prüfgegenstand: <i>Test item:</i>	LED Screen 12*36 for Perfume case			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	DIAM-LED1236 FPC 2020			
Auftrags-Inhalt: <i>Order content:</i>	Test report			
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209 CFR47 FCC Part 2.1091	RSS-247 Issue 2 February 2017 RSS-Gen Issue 5 April 2018 RSS-102 Issue 5 March 2015		
Wareneingangsdatum: <i>Date of sample receipt:</i>	27.11.2020			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A002949920 001/002			
Prüfzeitraum: <i>Testing period:</i>	28.11.2020 - 18.01.2021			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd. Testing Center			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	<u>X Jonathan Li</u>	genehmigt von: <i>authorized by:</i>	<u>X Winnie Hou</u>	
Datum: <i>Date:</i>	2021-03-15	Ausstellungsdatum: <i>Issue date:</i>	2021-03-15	
	<small>Signed by: Jonathan Li</small>		<small>Signed by: Winnie Hou</small>	
Stellung / Position	Project Manager	Stellung / Position	Technical Certifier	
Sonstiges / Other: FCC ID: 2AYR6-2021TBD1236 IC: 26905-2021TBD1236 HVIN:DIAM-LED1236 FPC 2020				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged:</i>		
<p>* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested</p>				
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p>				

V05

Test Summary

5.1.1 ANTENNA REQUIREMENT*RESULT: Pass***5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER***RESULT: Pass***5.1.3 CONDUCTED POWER SPECTRAL DENSITY***RESULT: Pass***5.1.4 6dB BANDWIDTH***RESULT: Pass***5.1.5 99% BANDWIDTH***RESULT: Pass***5.1.6 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH***RESULT: Pass***5.1.7 RADIATED SPURIOUS EMISSION***RESULT: Pass***5.1.8 CONDUCTED EMISSIONS***RESULT: Pass***6.1.1 ELECTROMAGNETIC FIELDS***RESULT: Pass*

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1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Photographs of EUT

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd. Testing Center
362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China

FCC Accreditation Designation No.: CN1260
ISED wireless device testing laboratory: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

TÜV Rheinland (Shenzhen) Co., Ltd.

Radio Spectrum Testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Wireless Connectivity Tester	Rohde & Schwarz	CMW270	101375	2021-08-30
Signal Analyzer	Rohde & Schwarz	FSV 40	101441	2021-08-30
Vector Signal Generator	Rohde & Schwarz	SMBV100A	263301	2021-08-30
Signal Generator	Rohde & Schwarz	SMB100A	115186	2021-08-30
OSP	Rohde & Schwarz	OSP 150	101017	2021-12-20
Control PC	DELL	OptiPlex 7050	FTJZ9P2	N/A
Test Software	Rohde & Schwarz	WMS32 (V10.40.10)	N/A	N/A
Power Meter	Rohde & Schwarz	NRP2	107105	2021-12-20
Wideband Power Sensor	Rohde & Schwarz	NRP-Z81	105350	2021-12-20
Unwanted Emission Testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Signal Generator	Rohde & Schwarz	SMB100A	180840	2021-08-30
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	165339	2021-08-30
Signal Analyzer	Rohde & Schwarz	FSV 40	101440	2021-08-30
System Controller Interface	Rohde & Schwarz	SCI-100	S10010036	N/A
Filterbank	Rohde & Schwarz	CDMA	100751	2021-08-30
Filterbank	Rohde & Schwarz	GSM	100811	2021-08-30
OSP	Rohde & Schwarz	OSP 120	102041	N/A
OSP	Rohde & Schwarz	OSP 150	101385	N/A
Pre-amplifier	Rohde & Schwarz	SCU08F1	08320030	2021-08-30
Amplifier	Rohde & Schwarz	SCU-18F	180079	2021-08-30

Amplifier	Rohde & Schwarz	SCU40A	100450	2021-09-03
Trilog Broadband Antenna (30 MHz - 1 GHz)	Schwarzbeck	VULB9162	192	2021-09-02
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218719	2021-09-02
Wideband Ridged Horn Antenna (12- 18 GHz)	Steatite	QMS-00208	18312	2021-09-02
Wideband Ridged Horn Antenna (18- 40 GHz)	Steatite	QMS-00880	19066	2021-09-02
Biconical Broadband Antenna (30 MHz - 1 GHz)	Schwarzbeck	VUBA 9117	357	2021-09-02
Double Ridged Broadband Horn Antenna (1 – 18 GHz)	Schwarzbeck	BBHA 9120 D	01760	2021-09-02
Broadband Horn Antenna (15 – 40 GHz)	Schwarzbeck	BBHA 9170	00862	2021-09-02
Test software	Rohde & Schwarz	EMC32 (V10.40.00)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NW9P2	N/A
Terminal Disturbance Voltage at Mains Terminals				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
EMI Test Receiver	R&S	ESR3	102428	2021-08-16
Artificial Mains Network	R&S	ENV216	102333	2021-08-16
Artificial Mains Network	R&S	ENV432	101411	2021-08-16
Impedance Stabilisation Network	R&S	ENY81	100323	2021-08-16
Impedance Stabilisation Network	R&S	ENY81-CA6	101810	2021-08-16
Current Probe	R&S	EZ-17	101247	2021-08-17
Voltage Probe	R&S	ESH2-Z3	100557	2021-08-16
Attenuator	R&S	ESH2Z31	100300	2021-08-16
EMC32 test software	R&S	EMC32(Ver.10.50.01)	N/A	N/A

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-7}$
RF Power (conducted)	± 2.5 dB
Radiated Emission of Transmitter, valid up to 26.5 GHz	± 6 dB
Radiated Emission of Receiver, valid up to 26.5 GHz	± 6 dB
Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz)	± 3.70 dB / ± 3.30 dB
Radiated Emission (3m SAC), 30MHz to 1000MHz	± 4.52 dB
Radiated Emission (3m SAC), above 1000MHz	± 4.37 dB
Temperature	± 1 °C
Humidity	± 5 %
Voltage (DC)	± 1 %
Voltage (AC, <10kHz)	± 2 %

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd.. file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Testing Center Test facility located at 362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a LED Screen 12*36 for Perfume case with Bluetooth Low Energy technology. Bluetooth cannot operate when charging via Micro-USB port. For details, refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	LED Screen 12*36 for Perfume case
Type Designation	DIAM-LED1236 FPC 2020
Trade Mark	N/A
FCC ID	2AYR6-2021TBD1236
IC	26905-2021TBD1236
HVIN	DIAM-LED1236 FPC 2020
Operating Voltage	DC 3.7V by rechargeable lithium battery
Testing Voltage	DC 3.7V by rechargeable lithium battery DC 5.0V Charged by USB port
Technical Specification of BLE	
Operating Frequency	2402-2480MHz
Type of Modulation	GFSK
Data Rate	1M
Channel Number	40
Channel Separation	2MHz
Antenna Type	PCB layout antenna
Antenna Gain	-3 dBi

Table 3: RF Channel and Frequency of BLE

RF Channel	Frequency (MHz)						
00	2402.00	10	2422.00	20	2442.00	30	2462.00
01	2404.00	11	2424.00	21	2444.00	31	2464.00
02	2406.00	12	2426.00	22	2446.00	32	2466.00
03	2408.00	13	2428.00	23	2448.00	33	2468.00
04	2410.00	14	2430.00	24	2450.00	34	2470.00
05	2412.00	15	2432.00	25	2452.00	35	2472.00
06	2414.00	16	2434.00	26	2454.00	36	2474.00
07	2416.00	17	2436.00	27	2456.00	37	2476.00
08	2418.00	18	2438.00	28	2458.00	38	2478.00
09	2420.00	19	2440.00	29	2460.00	39	2480.00

Test frequencies are lowest channel: 2402 MHz, middle channel: 2440 MHz and highest channel: 2480 MHz.

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, transmitting mode
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- B. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- FCC/IC Label and Location Info
- User Manual
- Schematics
- PCB Layout

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013 and ANSI C63.4: 2014.

According to clause 3.1, all tests were performed on model DIAM-LED1236 FPC 2020 in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 4: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating
Laptop	Lenovo	T480	PF-16A6N8	N/A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

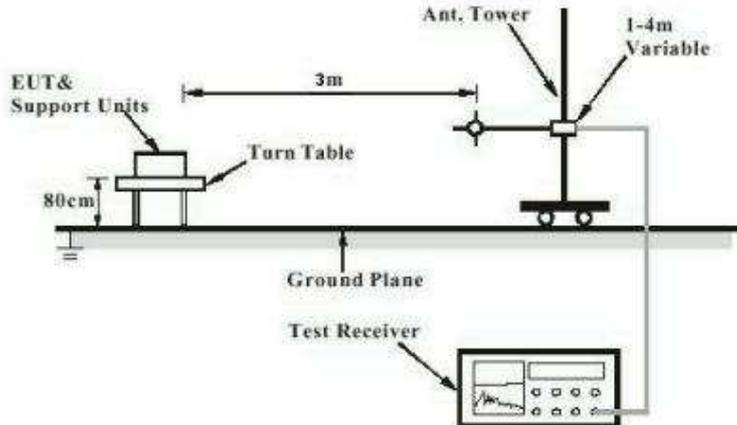


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

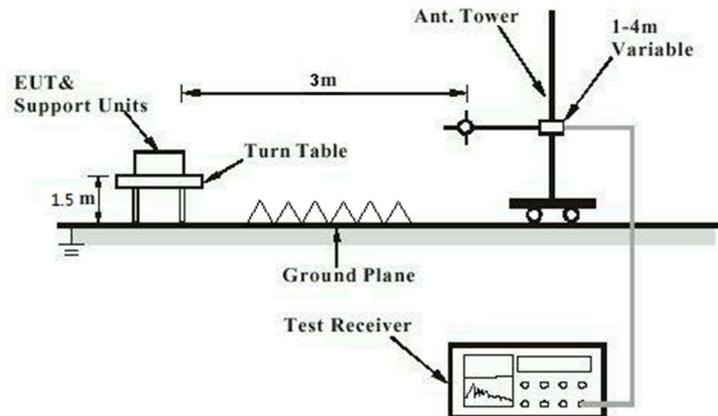


Diagram of Measurement Configuration for Mains Conduction Measurement

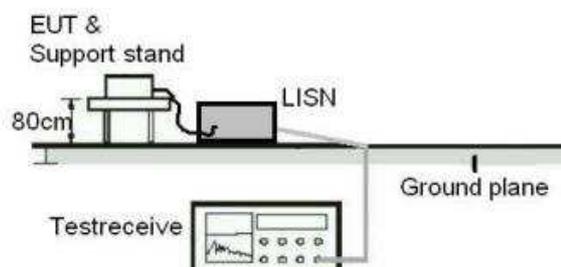


Diagram of Measurement Configuration for Mains Conduction Measurement

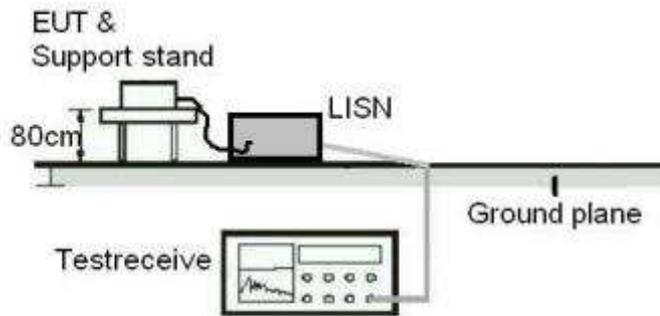
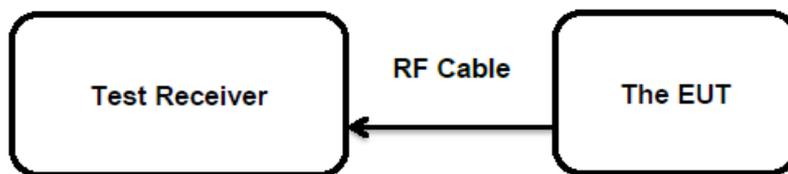


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Pass****Test Specification**

Test standard : FCC Part 15.247(b)(4) and Part 15.203
RSS-Gen Clause 6.8

According to the manufacturer declared, the EUT has a PCB layout antenna, the directional gain of antenna is -3dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Peak Conducted Output Power

RESULT:
Pass
Test Specification

Test standard : FCC Part 15.247(b)(3)
 : RSS-247 Clause 5.4(d)
 Basic standard : ANSI C63.10: 2013
 Limits : 1.0 Watts=30dBm
 Kind of test site : Shielded Room

Test Setup

Date of testing : 11.01.2021
 Input voltage : DC 3.7V
 Operation mode : A
 Test channel : Low / Middle / High
 Ambient temperature : 25 °C
 Relative humidity : 56 %
 Atmospheric pressure : 101 kPa

For details refer to following test result.

Table 5: Test Result of Maximum Peak Conducted Output Power

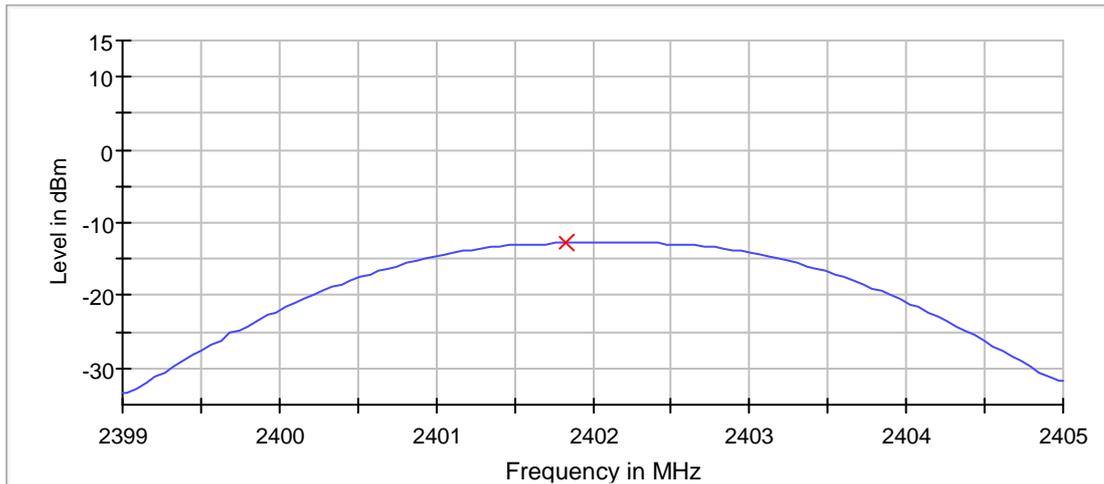
Channel	Channel Frequency (MHz)	Peak Output Power	Limit
		(dBm)	(dBm)
Low Channel	2402	-12.8	30
Middle Channel	2440	-14.4	30
High Channel	2480	-14.6	30

Note:

- 1) The cable loss is taken into account in results.
- 2) Antenna gain(G): -3dBi
 e.i.r.p.=P_(Peak power)+ G, which is far below the 4 W

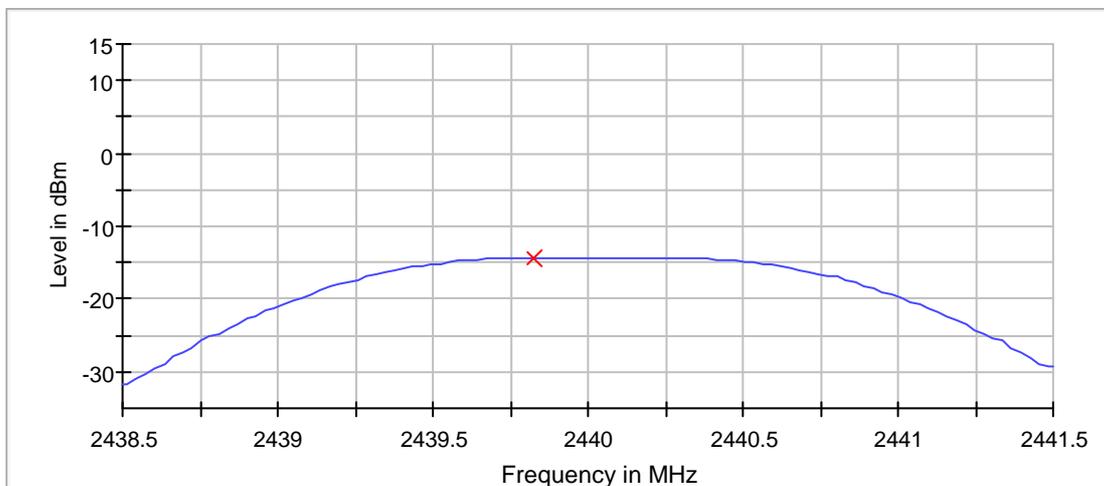
RBW=2MHz, VBW=10MHz

Peak Power



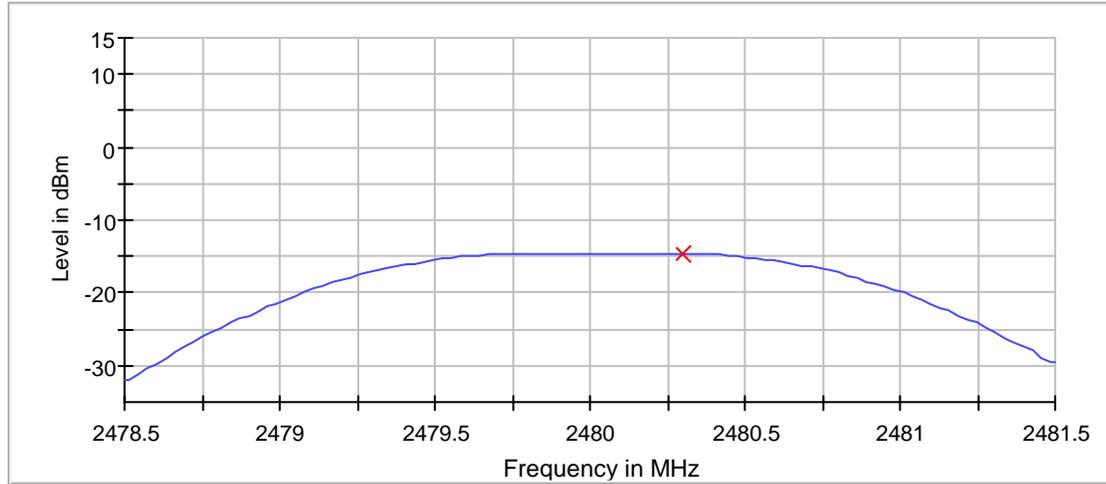
— Connector 1 × Peak Connector 1

Peak Power



— Connector 1 × Peak Connector 1

Peak Power



— Connector 1 × Peak Connector 1

5.1.3 Conducted Power Spectral Density

RESULT:
Pass
Test Specification

Test standard : FCC Part 15.247(e)
 : RSS-247 Clause 5.2(b)
 Basic standard : ANSI C63.10: 2013
 Limits : < 8 dBm / 3kHz
 Kind of test site : Shielded Room

Test Setup

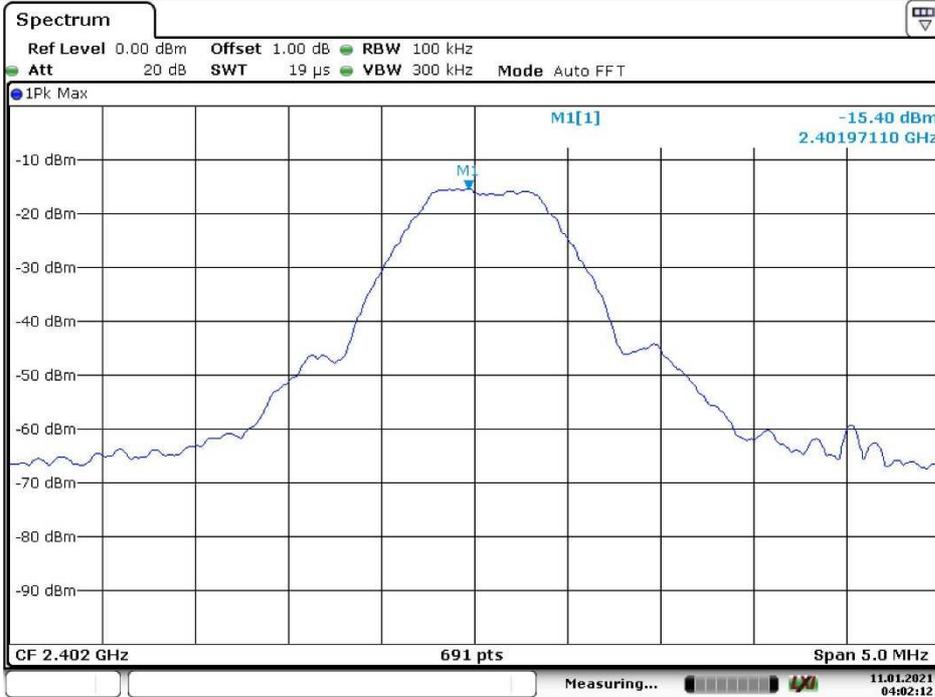
Date of testing : 11.01.2021
 Input voltage : DC 3.7V
 Operation mode : A
 Test channel : Low / Middle / High
 Ambient temperature : 25 °C
 Relative humidity : 56 %
 Atmospheric pressure : 101 kPa

For details refer to following test result.

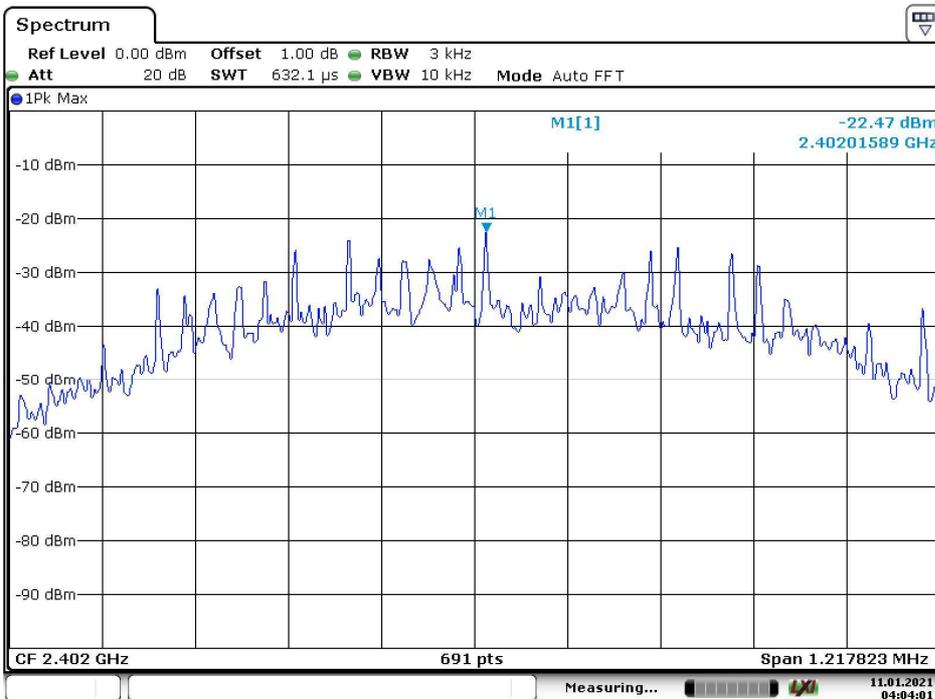
Table 6: Test Result of Power Spectral Density

Channel	Channel Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
Low Channel	2402	-22.47	8
Middle Channel	2440	-23.95	8
High Channel	2480	-24.16	8

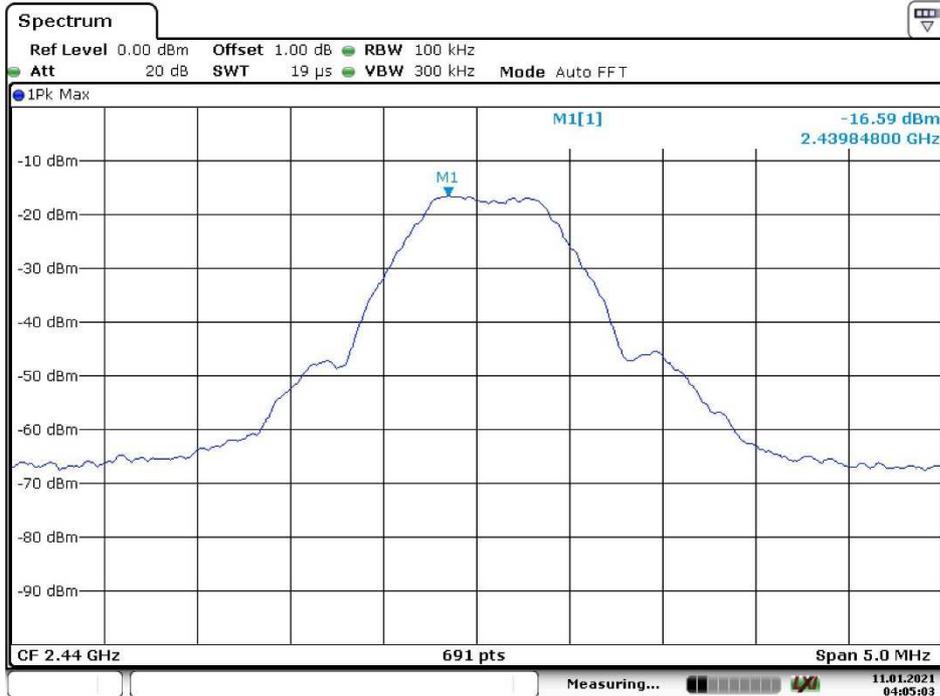
Note: The cable loss is taken into account in results.

Low Channel-2402MHz


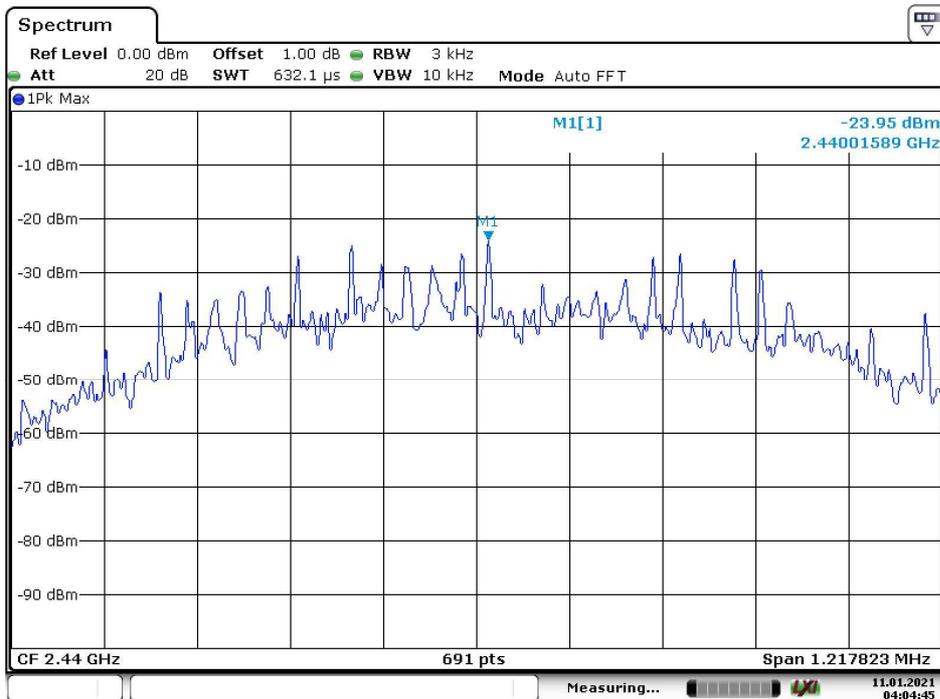
Date: 11.JAN.2021 04:02:12



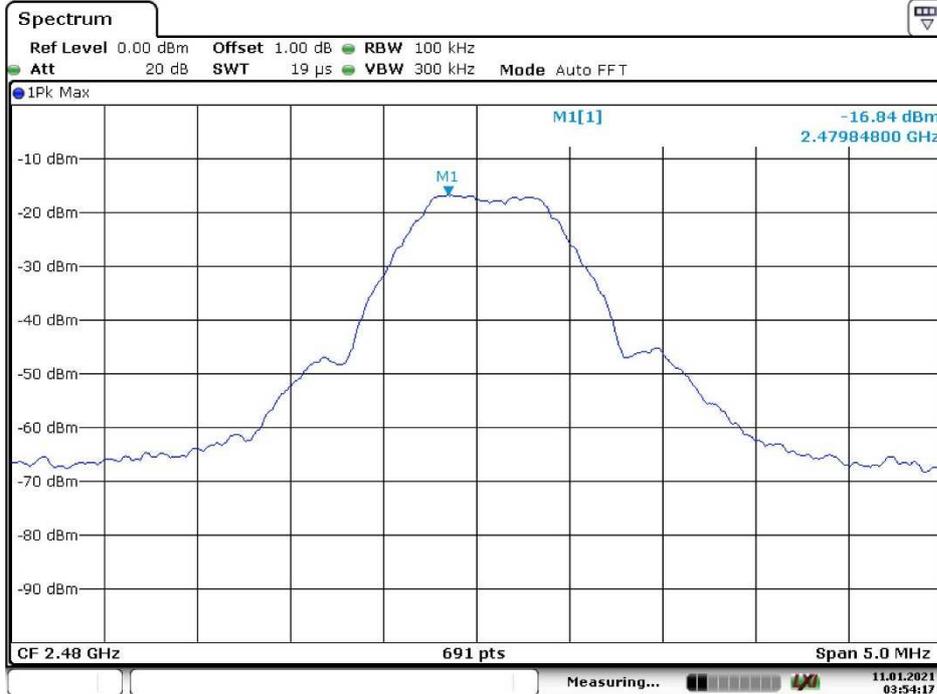
Date: 11.JAN.2021 04:04:01

Middle Channel-2440MHz


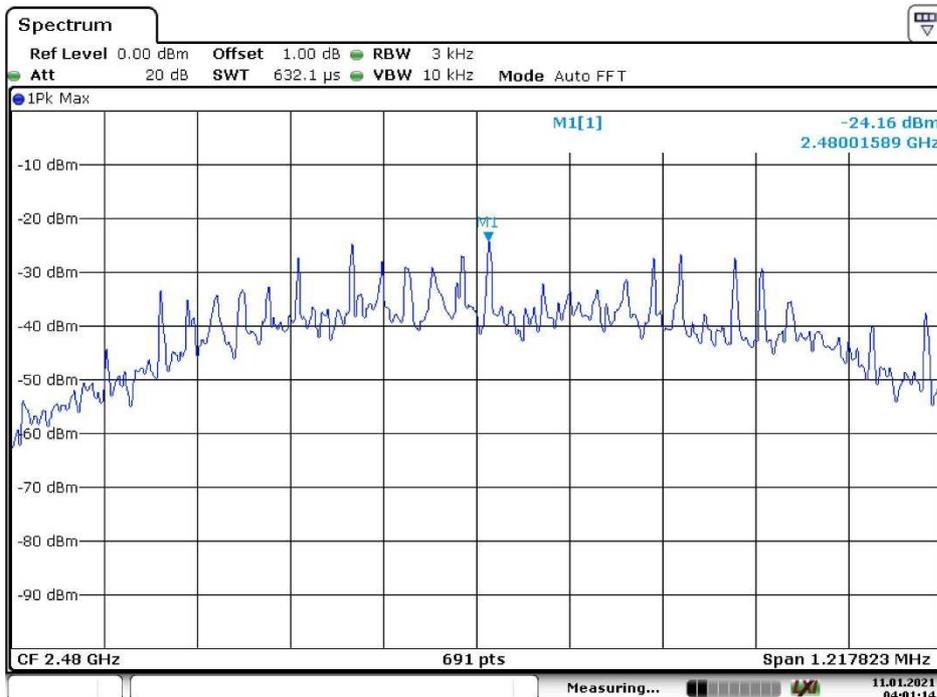
Date: 11.JAN.2021 04:05:03



Date: 11.JAN.2021 04:04:44

High Channel-2480MHz


Date: 11.JAN.2021 03:54:18



Date: 11.JAN.2021 04:01:14

5.1.4 6dB Bandwidth

RESULT:
Pass
Test Specification

Test standard : FCC Part 15.247(a)(2)
 : RSS-247 Clause 5.2(a)
 Basic standard : ANSI C63.10: 2013
 Limits : > 500 KHz
 Kind of test site : Shielded Room

Test Setup

Date of testing : 11.01.2021
 Input voltage : DC 3.7V
 Operation mode : A
 Test channel : Low / Middle / High
 Ambient temperature : 25 °C
 Relative humidity : 56 %
 Atmospheric pressure : 101 kPa

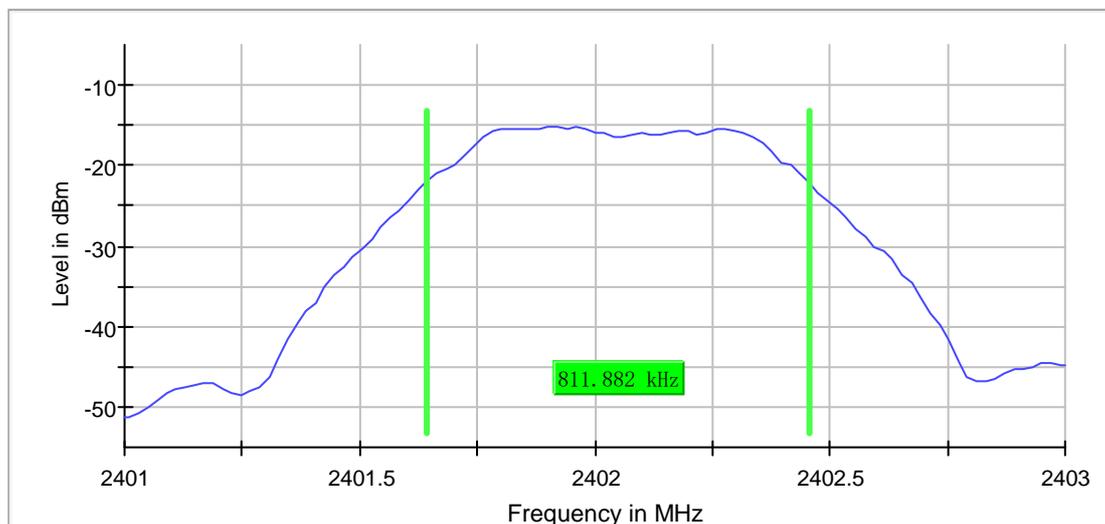
For details refer to following test result.

Table 7: Test Result of 6dB Bandwidth

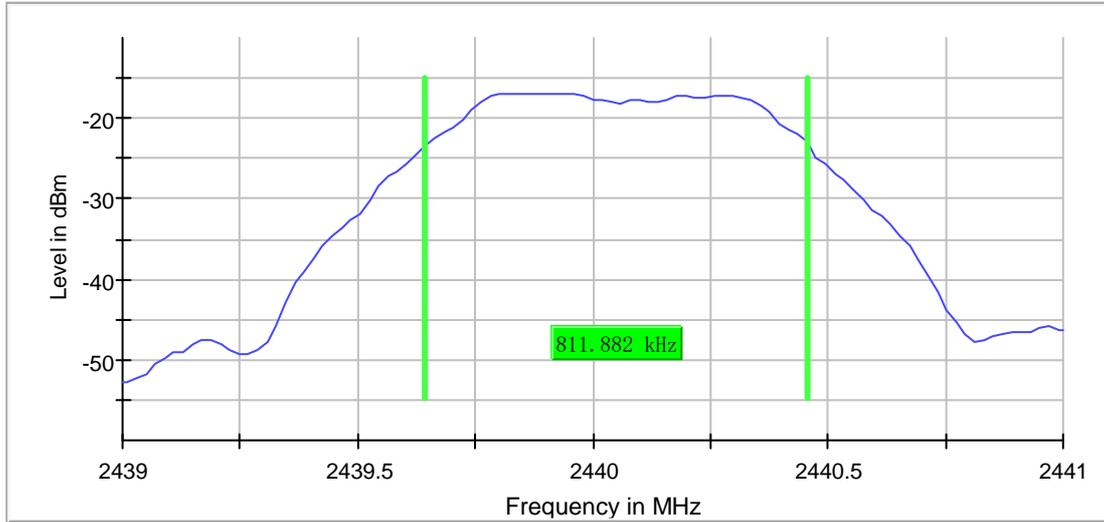
Channel	Channel Frequency (MHz)	-6dB Bandwidth (kHz)	Limit (kHz)	Result
Low Channel	2402	811.882	500	Pass
Mid Channel	2440	811.882	500	Pass
High Channel	2480	811.882	500	Pass

RBW=100 KHz, VBW=300 KHz

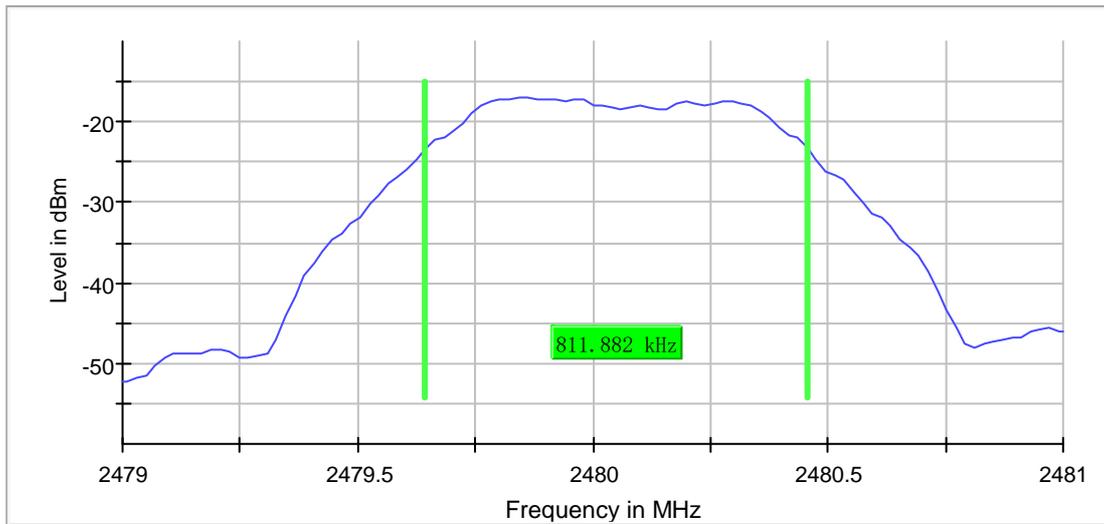
6 dB Bandwidth



6 dB Bandwidth



6 dB Bandwidth



5.1.5 99% Bandwidth

RESULT:
Pass
Test Specification

Test standard : FCC Part 15.247(a)
 Basic standard : ANSI C63.10: 2013
 Kind of test site : Shielded Room

Test Setup

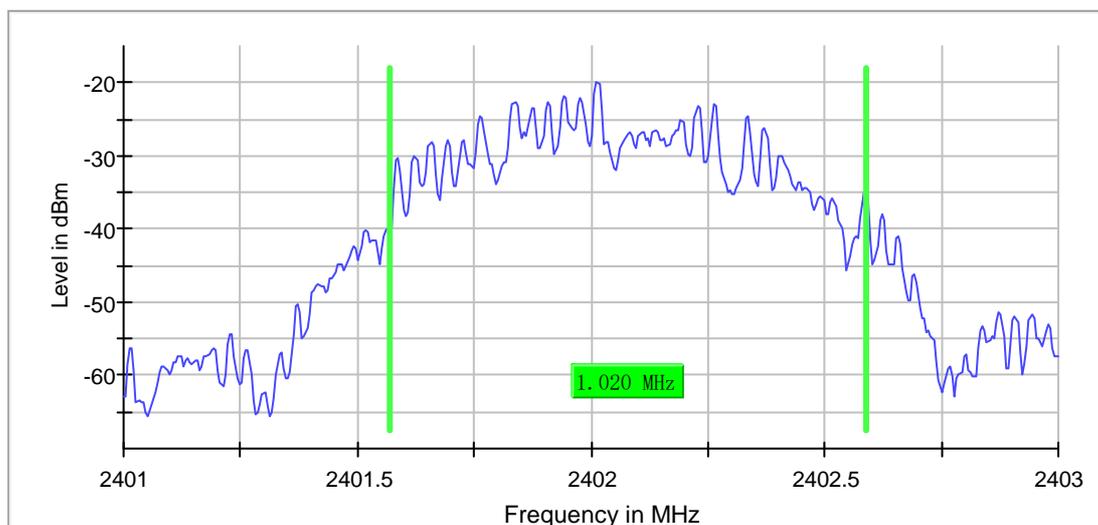
Date of testing : 11.01.2021
 Input voltage : DC 3.7V
 Operation mode : A
 Test channel : Low / Middle / High
 Ambient temperature : 25 °C
 Relative humidity : 56 %
 Atmospheric pressure : 101 kPa

Table 8: Test Result of 99% Bandwidth

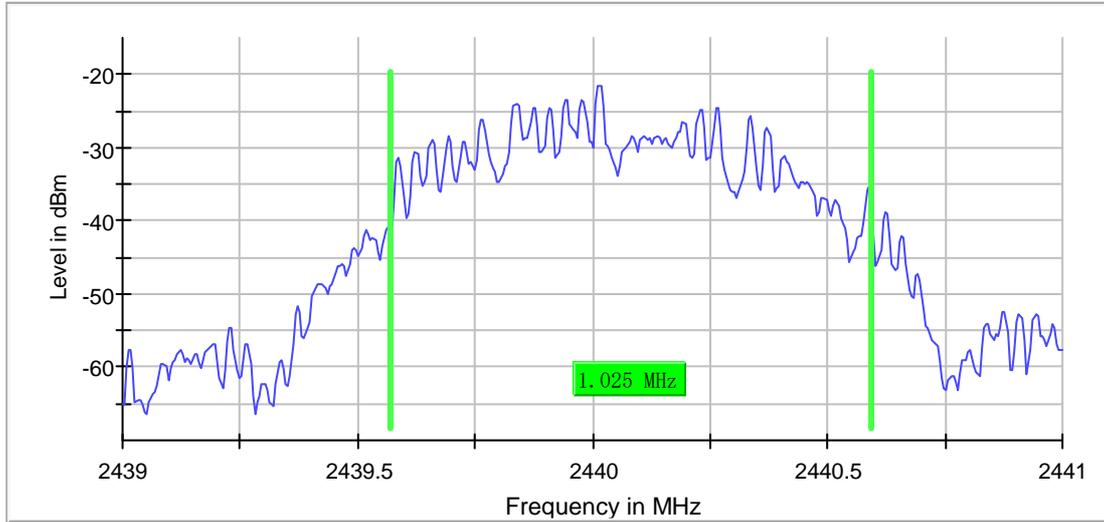
Channel	Channel Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Result
Low Channel	2402	1025	--	Pass
Mid Channel	2440	1025	--	Pass
High Channel	2480	1025	--	Pass

RBW=10KHz, VBW=30KHz

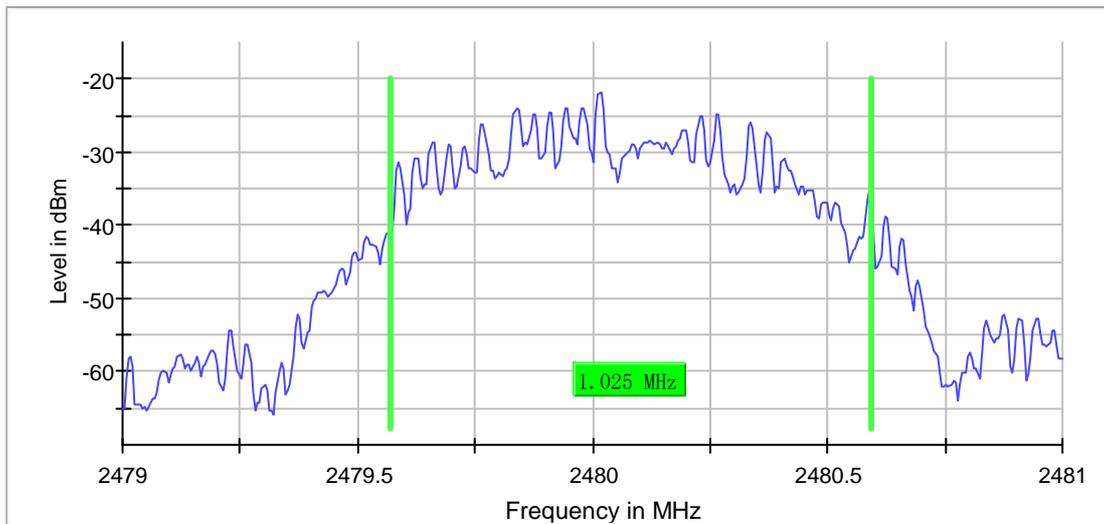
99 % Bandwidth



99 % Bandwidth



99 % Bandwidth



5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: **Pass**

Test Specification

Test standard : FCC Part 15.247(d)
RSS-247 Clause 5.5

Basic standard : ANSI C63.10: 2013

Limits : 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power);
In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)

Kind of test site : Shielded Room

Test Setup

Date of testing : Refer to test data

Input voltage : DC 3.7V

Operation mode : A

Test channel : Low / Middle / High

Ambient temperature : 25 °C

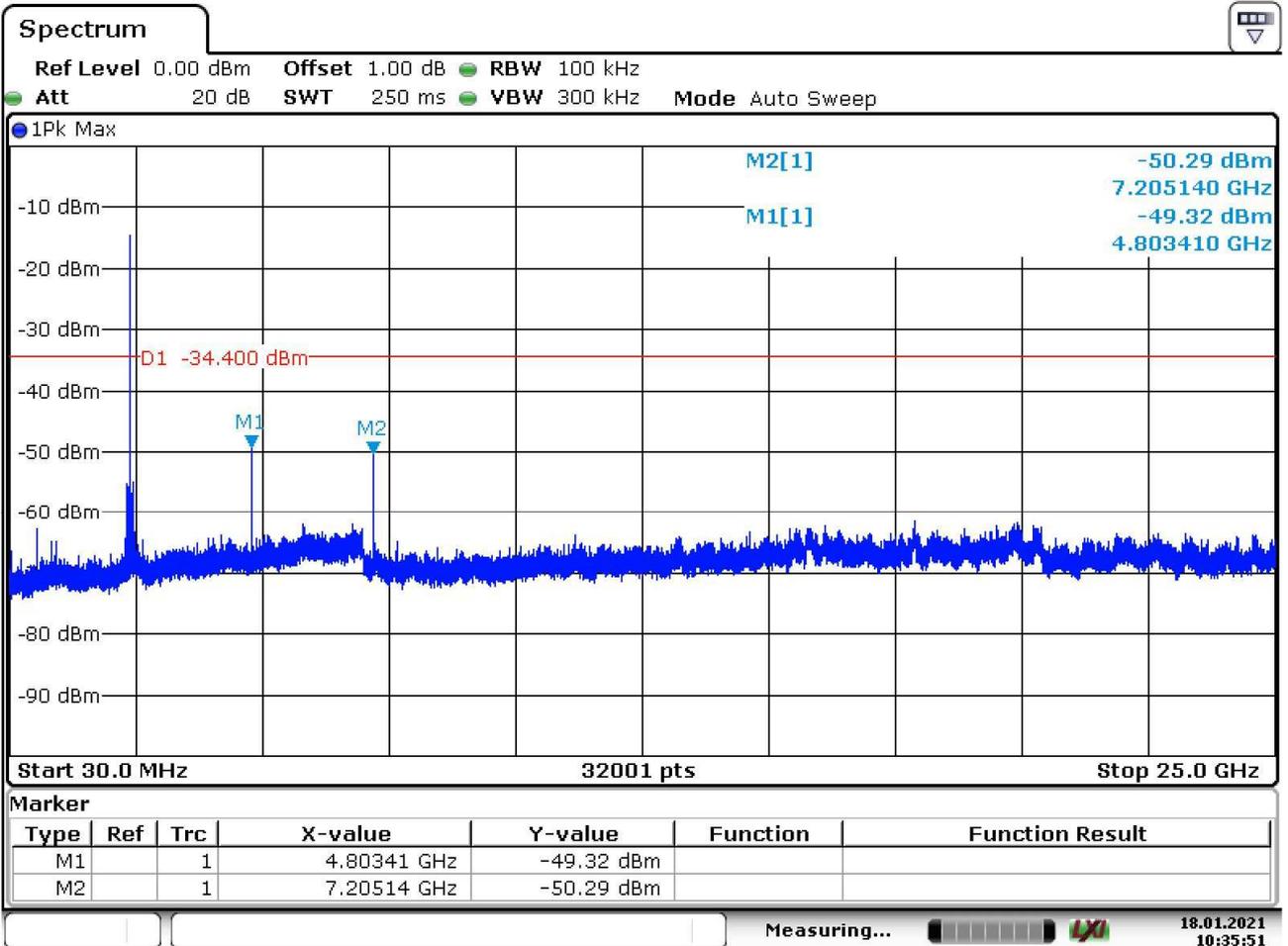
Relative humidity : 56 %

Atmospheric pressure : 101 kPa

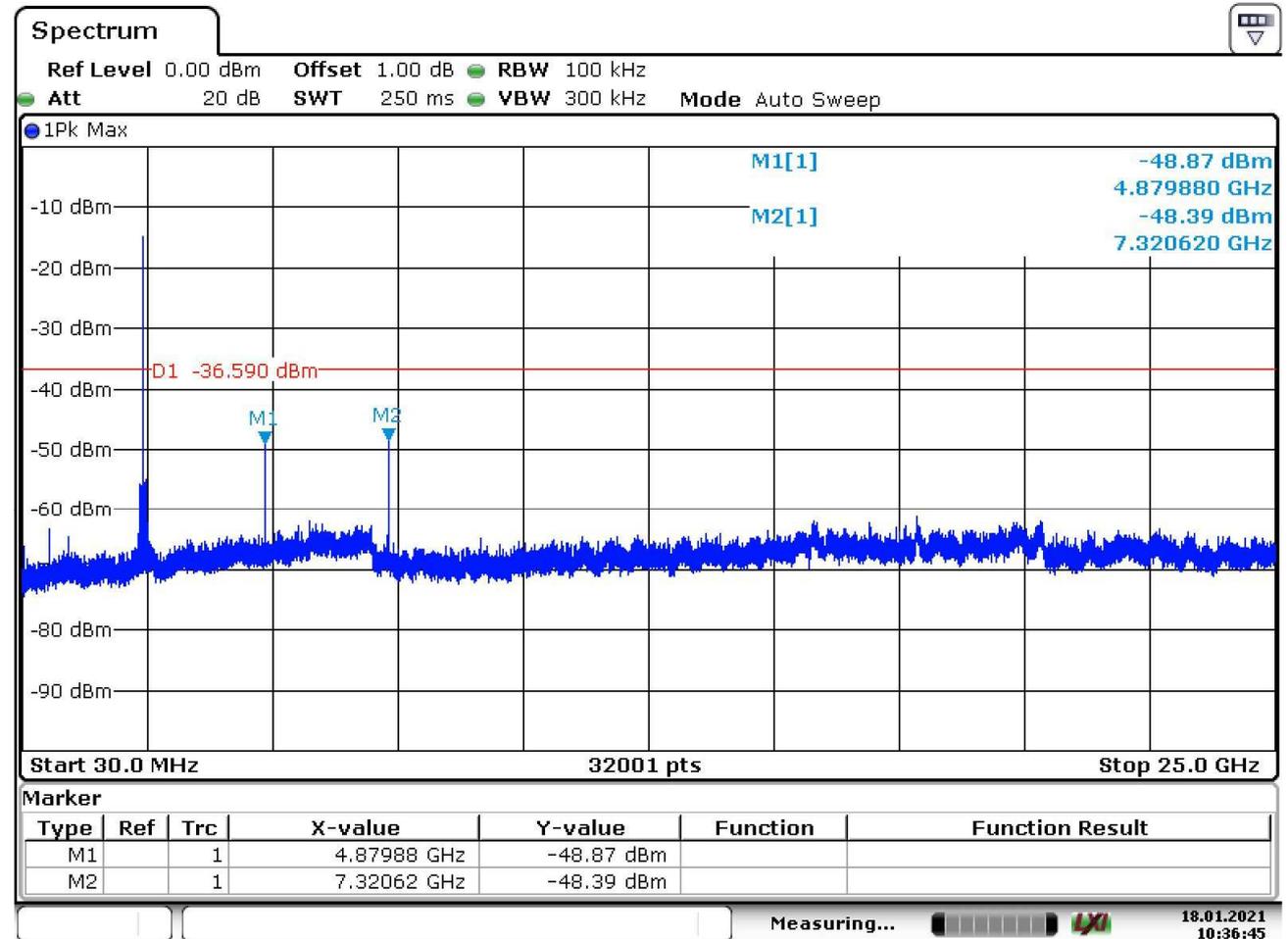
Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

Table 9: Test Result of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

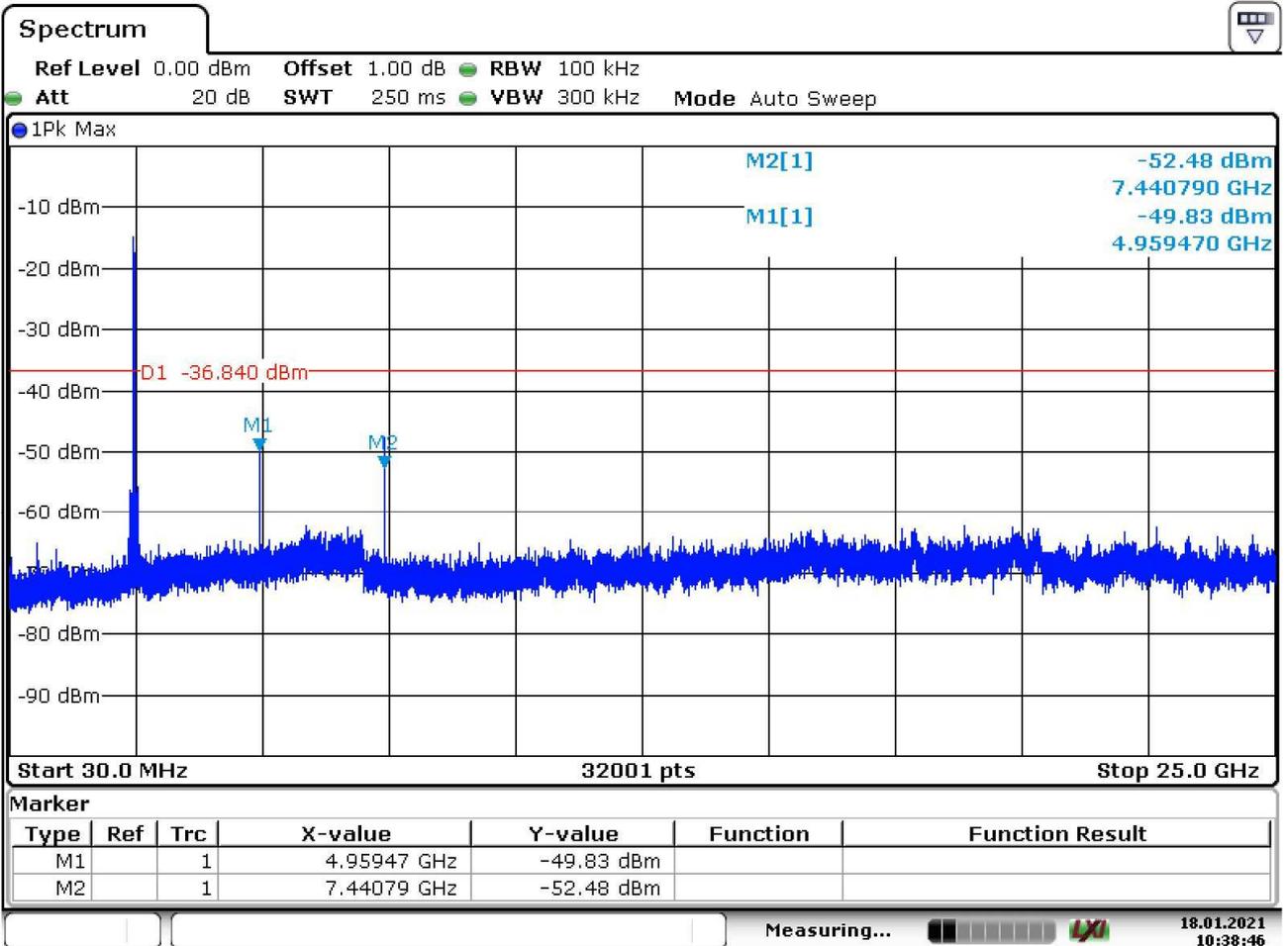
Channel	Observed Frequency (GHz)	Worst case observed value (dBm)	Limit	Result
Low Channel	4.804	-49.32dBm	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power)	Pass
Mid Channel	4.880	-48.87dBm		Pass
High Channel	4.960	-49.83dBm		Pass



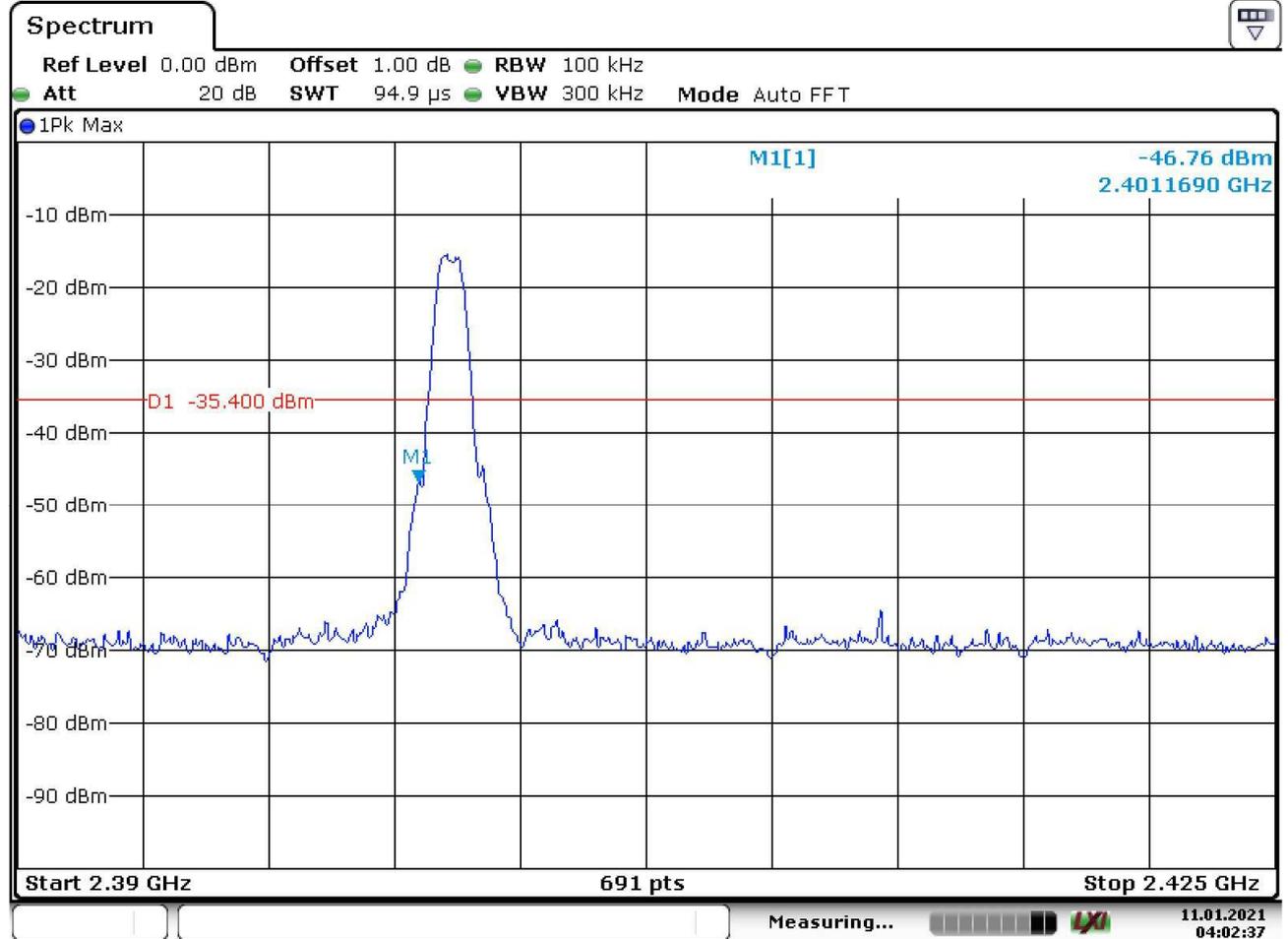
Date: 18.JAN.2021 10:35:51



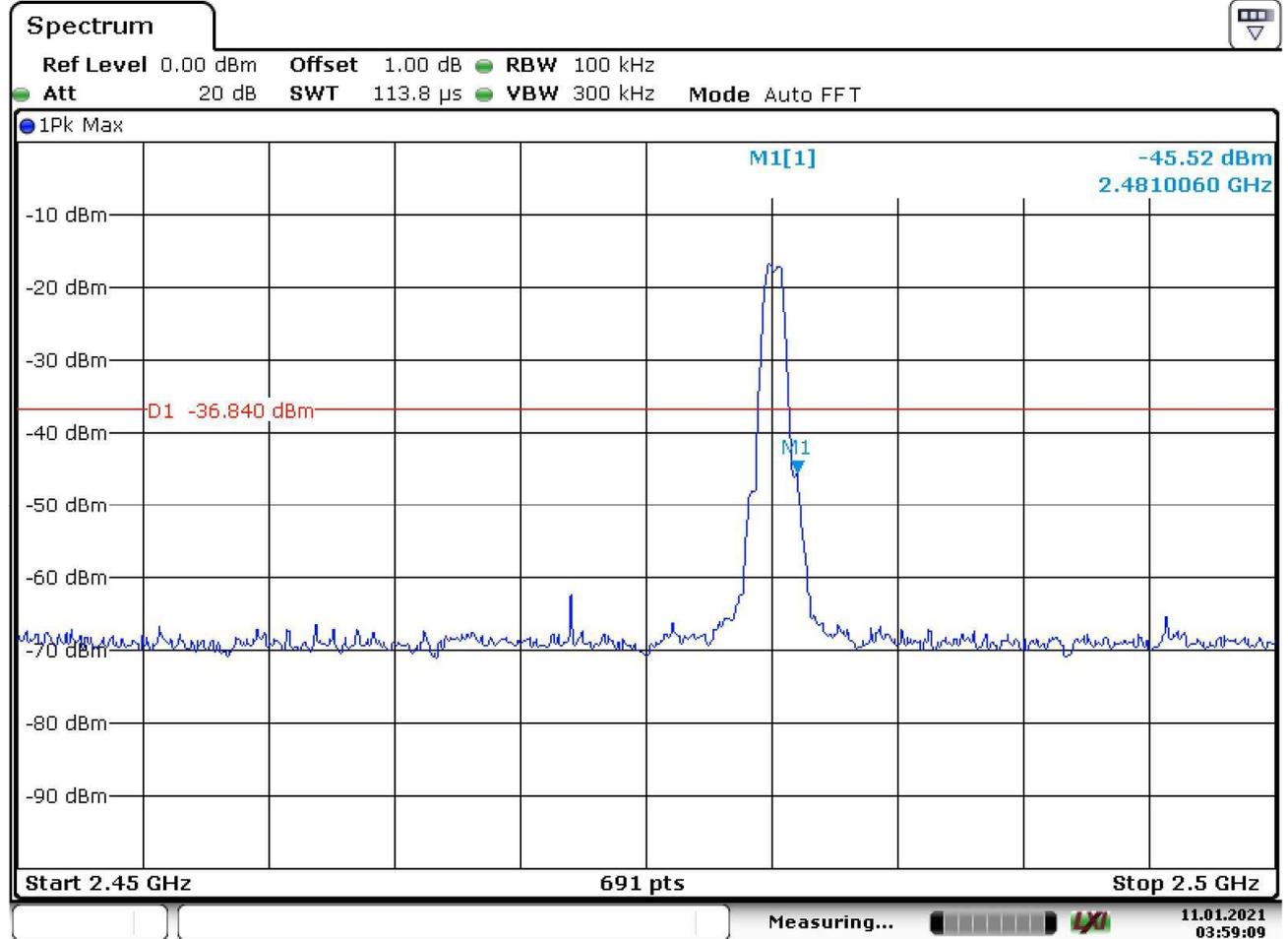
Date: 18.JAN.2021 10:36:45



Date: 18.JAN.2021 10:38:46

Low Channel_Band Edge


Date: 11.JAN.2021 04:02:36

High Channel_Band Edge


Date: 11.JAN.2021 03:59:09

5.1.7 Radiated Spurious Emission

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3
Basic standard	: ANSI C63.10: 2013
Limits	: Refer to 15.209(a) of FCC part 15.247(d)
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: Refer to test result
Input voltage	: DC 3.7V
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: Refer test data
Relative humidity	: Refer test data
Atmospheric pressure	: 101 kPa

Remark:

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst-case spurious emissions configuration of the each mode were reported.

5.1.8 Conducted Emissions**RESULT:****Pass****Test Specification**

Test standard	:	FCC Part 15.207(a) RSS-Gen Clause 8.8
Basic standard	:	ANSI C63.10: 2013
Frequency range	:	0.15MHz to 30MHz
Classification	:	Class B
Limits	:	FCC Part 15.207(a) RSS-Gen Table 3
Kind of test site	:	Shielded Room

Test Setup

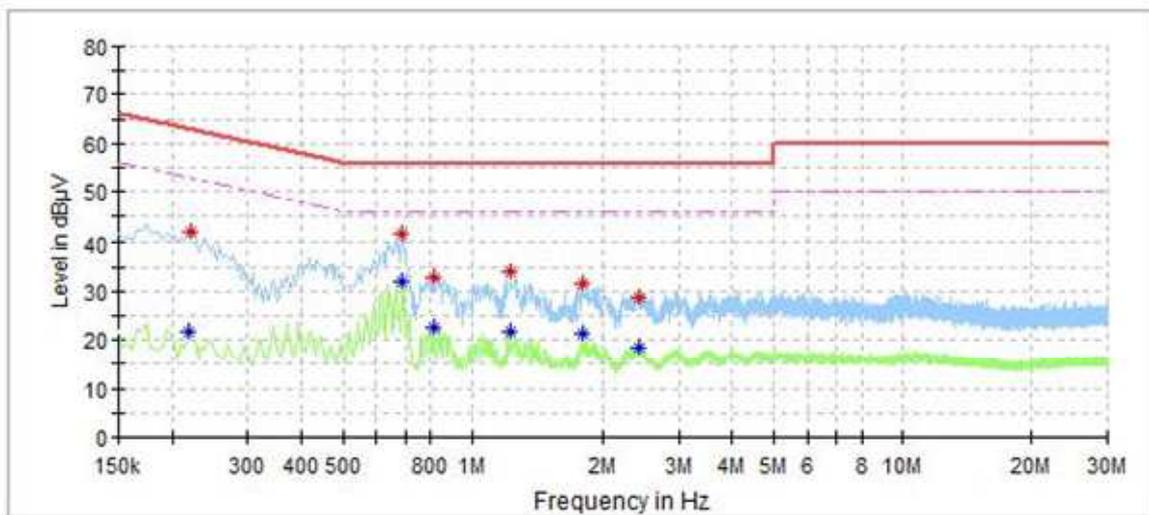
Date of testing	:	2020-12-02
Input voltage	:	DC 5.0V
Operation mode	:	A.1
Earthing	:	Not connected
Ambient temperature	:	24.9 °C
Relative humidity	:	54 %
Atmospheric pressure	:	101 kPa

Refer below for detail test data.

Test Report

EUT Information

EUT Name:	LED Screen 12*36 for Perfume case
Model:	DIAM-LED1236 FPC 2020
Test Mode:	Charging
Test Voltage:	AC 120V/60Hz
Test By:	Richard Lin
Review By:	Gary Chen
Remark:	SR1



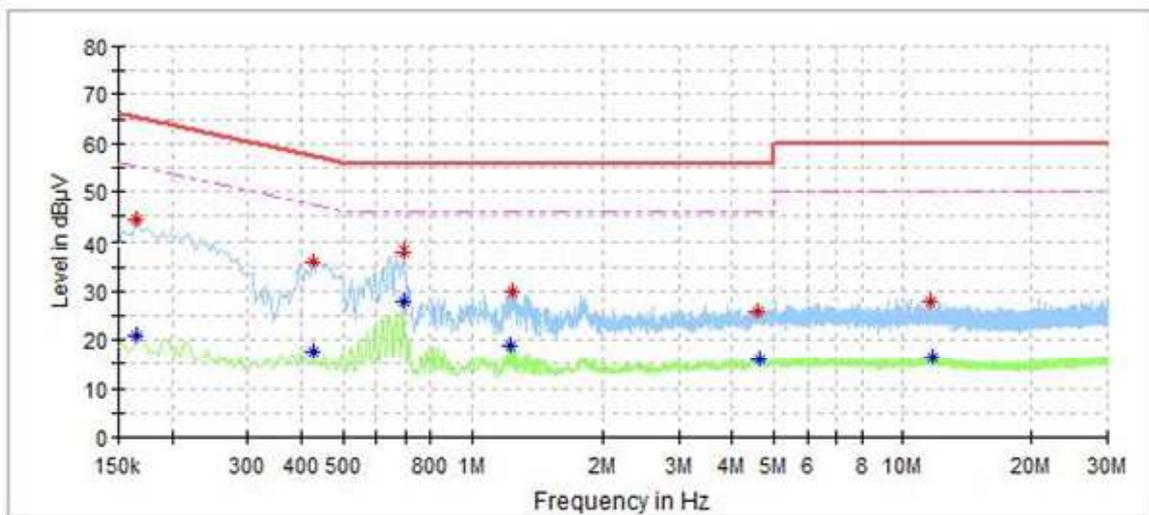
Critical Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.218000	--	21.75	52.90	31.14	L1	9.6
0.222000	41.83	--	62.74	20.91	L1	9.6
0.688000	--	32.04	46.00	13.96	L1	9.7
0.688000	41.30	--	56.00	14.70	L1	9.7
0.812000	32.73	--	56.00	23.27	L1	9.7
0.816000	--	22.59	46.00	23.41	L1	9.7
1.228000	33.97	--	56.00	22.03	L1	9.7
1.232000	--	21.58	46.00	24.42	L1	9.7
1.796000	31.58	--	56.00	24.42	L1	9.7
1.800000	--	21.18	46.00	24.82	L1	9.7
2.424000	28.87	--	56.00	27.13	L1	9.8
2.440000	--	18.41	46.00	27.59	L1	9.8

Test Report

EUT Information

EUT Name:	LED Screen 12*36 for Perfume case
Model:	DIAM-LED1236 FPC 2020
Test Mode:	Charging
Test Voltage:	AC 120V/60Hz
Test By:	Richard Lin
Review By:	Gary Chen
Remark:	SR1



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.166000	44.34	---	65.16	20.82	N	9.6
0.166000	---	20.90	55.16	34.26	N	9.6
0.426000	---	17.67	47.33	29.66	N	9.7
0.426000	36.04	---	57.33	21.29	N	9.7
0.692000	37.99	---	56.00	18.01	N	9.7
0.692000	---	27.94	46.00	18.06	N	9.7
1.236000	---	18.93	46.00	27.07	N	9.7
1.240000	29.97	---	56.00	26.03	N	9.7
4.588000	25.97	---	56.00	30.03	N	9.9
4.632000	---	16.07	46.00	29.93	N	9.9
11.548000	27.97	---	60.00	32.03	N	10.2
11.676000	---	16.40	50.00	33.60	N	10.2

6 Safety Human Exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:

Pass

Test Specification

Test standard : CFR47 FCC Part 2.1091
RSS-102 Issue 5 March 2015
FCC KDB Publication 447498 v06

Limit : CFR47 FCC Part 1.1310

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

MPE Calculation Method according to OET Bulletin 65

Power Density: $S_{(mW/cm^2)} = PG/4\pi R^2$ or $EIRP/4\pi R^2$

Where:

S = power density (mW/cm²)

P = power input to the antenna (mW)

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 (cm)

The nominal maximum conducted output power specified:

BLE: -12.80 dBm

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain (-3.00 dBi), the RF power density can be calculated as below:

For BLE: $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.000005mW/cm^2$

Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310: 1.0 mW/cm²

IC requirements: The EUT shall comply with the requirement of RSS-102 section 2.5.2.

Exemption from Routine Evaluation Limits – 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:

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 $1.31 \times 10^{-2} f^{0.6834} \text{ W}$ (adjusted for tune-up tolerance), where f is in MHz;
RF exposure evaluation exempted power for 2.4G DTS: 2.676 W

The e.i.r.p. of EUT is less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

“RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”

7 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

8 Photographs of EUT

For photographs of the EUT, refer to the appendix B.

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