FCC PART 15.249
TEST REPORT

For

LEEDARSON LIGHTING CO., LTD.

Xingda Road, Xingtai Industrial Zone, Changtai County, Zhangzhou, Fujian, China

FCC ID: 2AB2Q-11A21100WCCTM

Report Type:	**Product Type:**
Original Report	LED Lamp

Report Number: RXM210909050-00

Report Date: 2021-11-04

Reviewed By: Candy Li, RF Engineer

Prepared By: Shenzhen Accurate Technology Co., Ltd.
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Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	LED Lamp
Tested Model	11A21100WCCTM01
Multiple Model	11A21100WCCTMxx, 11aSy-A1600ST-Q1TZM-xx (Where "y" may be "A"-"Z" for different enclosure pattern design; "xx or XX" may be "00" to "99", which designates for different beam angle, color of eyelet contact, package of style, color of enclosure.)
Model Differences	Refer to the DoS letter
Frequency Range	5726MHz-5874MHz
Modulation Technique	CW
Antenna Specification	3.0dBi
Voltage Range	AC 120V/60Hz
Highest operating frequency	5874MHz
Date of Test	2021-10-08 to 2021-11-04
Sample serial number	RXM210909050-S1 (Assigned by ATC, Shenzhen)
Received date	2021-09-05
Sample/EUT Status	Good condition

Objective

This test report is in accordance with Part 2-Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Emissions, Radiated	30MHz - 1GHz	4.28dB
	1GHz- 18GHz	4.98dB
	18GHz- 26.5GHz	5.06dB
	26.5GHz- 40GHz	4.72dB
Temperature		1℃
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISEDC), the Registration Number is 5077A-2.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing by manufacturer.

Swept frequency range: 5726~5874MHz
Low channel: 5726MHz; Middle channel: 5800MHz; High channel: 5874MHz

EUT Exercise Software

EUT was test in test mode configured for testing by manufacturer and power level is default*.

Equipment Modifications

No modifications were made to the unit tested.

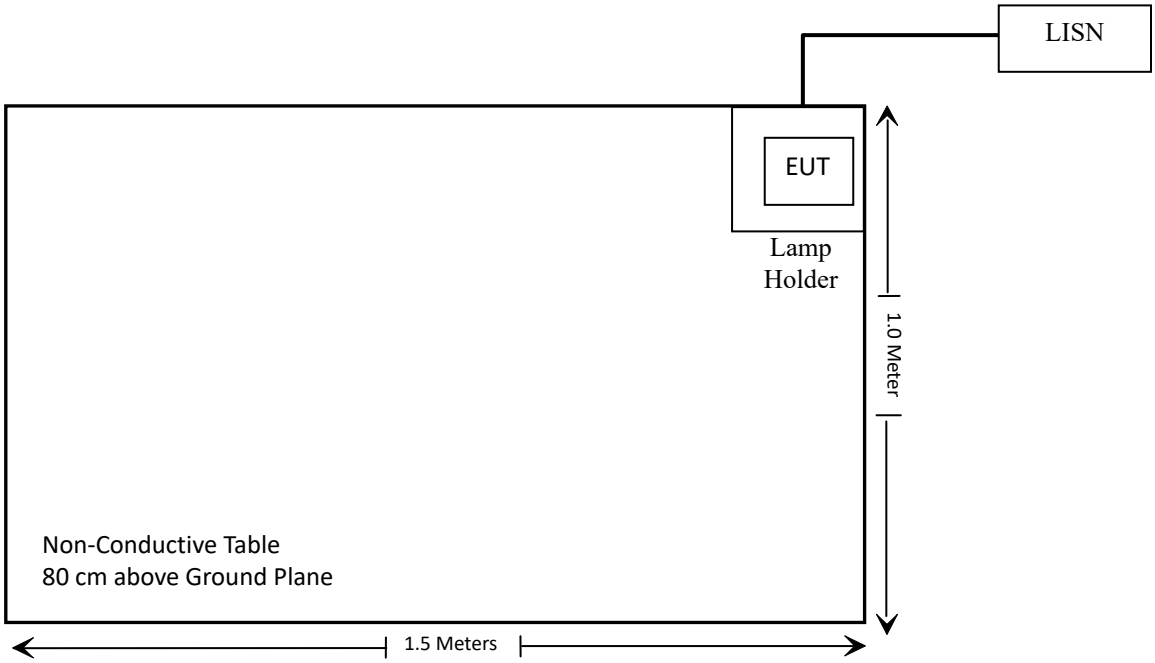
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Unknown	Lamp holder	Unknown	Unknown

Support Cable Descriptions

Cable Description	Length (m)	From/Port	To
Un-shielded un-detachable AC cable	1.2	Lamp holder	Mains

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conduction Emissions	Compliant
15.205, §15.209, §15.249(d)	Radiated Emissions& Outside of Band Emission	Compliant
§15.215 (c)	20 dB Bandwidth	Compliant

Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde& Schwarz	Test Receiver	ESPI3	100396	2020/12/24	2021/12/23
R & S	L.I.S.N.	ENV216	101314	2020/12/25	2021/12/24
Anritsu Corp	50ΩCoaxial Switch	MP59B	6200506474	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-2m	No.2	2020/12/25	2021/12/24
Rohde & Schwarz	Test Software	ES-K1 V1.71	Unknown	NCR	NCR
Radiated Emissions Test					
Rohde& Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
Rohde&Schwarz	Spectrum Analyzer	FSV40	101495	2020/12/24	2021/12/23
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
A.H. Systems, inc.	Preamplifier	PAM-0118P	531	2021/07/08	2022/07/07
Quinstar	Amplifier	QLW-184055 36-J0	15964001002	2020/11/28	2021/11/27
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2020/12/25	2021/12/24
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
OREGON SCIENTIFIC	Temperature & Humidity Meter	JB913R	GZ-WS004	2020/01/02	2023/01/01
FARAD	Test Software	EZ_EMC V 1. 1.4.2	V1.1.4.2	NCR	NCR
Unknown	RF Coaxial Cable	N-5m	No.3	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-5m	No.4	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.5	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.6	2020/12/25	2021/12/24
CD	Band Reject Filter	BRM-5.725/5. 875G-45	065	2020/12/25	2021/12/24
CD	High Pass Filter	HPM-8.0/18G -60	020	2020/12/25	2021/12/24

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, 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 shall be considered sufficient to comply with the provisions of this Section. 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.

Antenna Connector Construction

The EUT has one internal antenna which was permanently attached and the antenna gain is 3dBi, fulfill the requirement of this section. Please refer to the EUT photos.

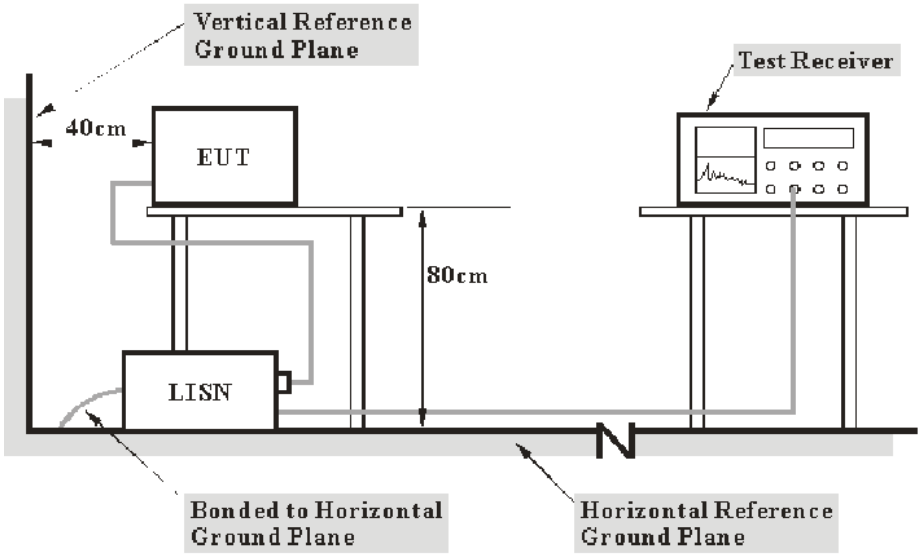
Result: Compliance.

FCC §15.207 – AC LINE CONDUCTED EMISSIONS

Applicable Standard

According to FCC §15.207

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with per ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the EUT complied with the FCC Part 15.207,

Test Data

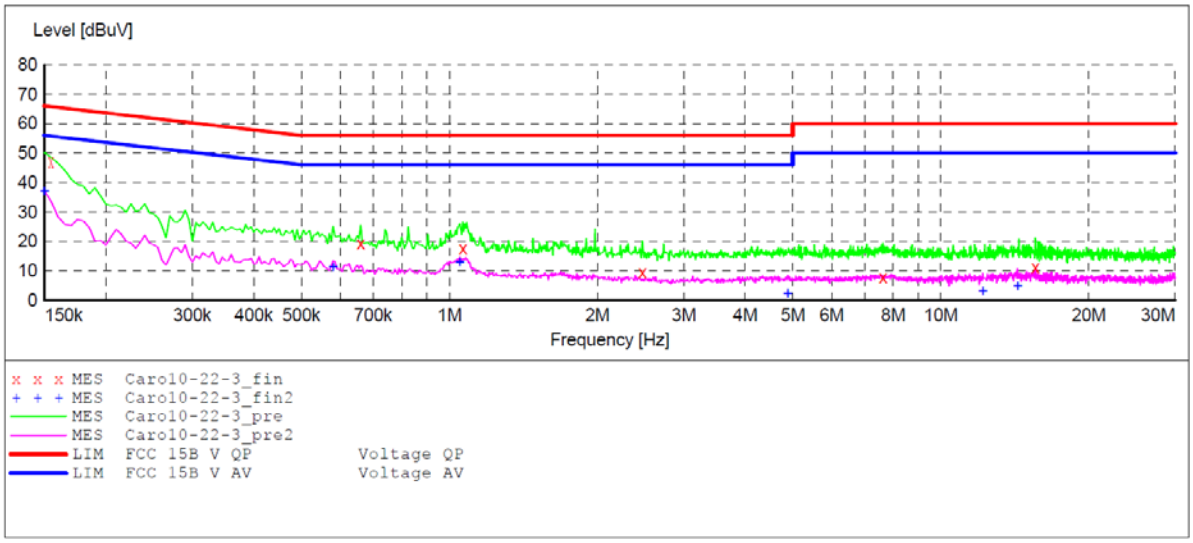
Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Caro hu on 2021-10-22.

EUT Operation Mode: Transmitting (worst case is low channel)

AC 120V/60 Hz, Line



MEASUREMENT RESULT: "Caro10-22-3_fin"

2021-10-22 03:04

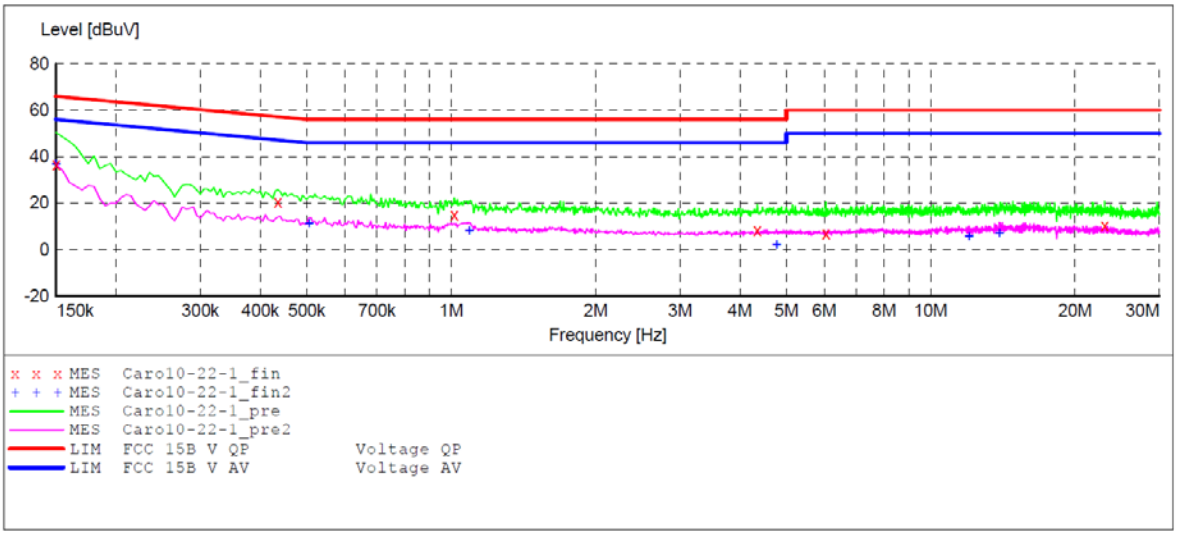
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	42.90	10.8	66	23.1	QP	L1	GND
0.660000	19.40	11.1	56	36.6	QP	L1	GND
1.065000	17.60	11.1	56	38.4	QP	L1	GND
2.470000	9.50	11.3	56	46.5	QP	L1	GND
7.630000	7.80	11.5	60	52.2	QP	L1	GND
15.575000	11.10	11.7	60	48.9	QP	L1	GND

MEASUREMENT RESULT: "Caro10-22-3_fin2"

2021-10-22 03:04

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	36.80	10.8	56	19.2	AV	L1	GND
0.580000	11.10	11.0	46	34.9	AV	L1	GND
1.050000	12.90	11.1	46	33.1	AV	L1	GND
4.880000	2.20	11.4	46	43.8	AV	L1	GND
12.175000	3.10	11.6	50	46.9	AV	L1	GND
14.325000	4.80	11.6	50	45.2	AV	L1	GND

AC 120V/60 Hz, Neutral



MEASUREMENT RESULT: "Caro10-22-1_fin"

2021-10-22 03:01

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	36.70	10.8	66	29.3	QP	N	GND
0.435000	20.40	11.0	57	36.8	QP	N	GND
1.015000	14.90	11.1	56	41.1	QP	N	GND
4.350000	8.20	11.4	56	47.8	QP	N	GND
6.050000	6.90	11.5	60	53.1	QP	N	GND
23.075000	10.50	11.7	60	49.5	QP	N	GND

MEASUREMENT RESULT: "Caro10-22-1_fin2"

2021-10-22 03:01

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	36.70	10.8	56	19.3	AV	N	GND
0.505000	11.00	11.0	46	35.0	AV	N	GND
1.090000	8.10	11.1	46	37.9	AV	N	GND
4.770000	2.10	11.4	46	43.9	AV	N	GND
12.025000	5.50	11.6	50	44.5	AV	N	GND
13.900000	7.00	11.6	50	43.0	AV	N	GND

Note:

1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
   The corrected factor has been input into the transducer of the test software.
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

FCC§15.205, §15.209 & §15.249(d) - RADIATED EMISSIONS

Applicable Standard

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

As per FCC§15.249 (d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test Equipment Setup

The spectrum analyzer or receiver is set as:

Below 1000MHz:

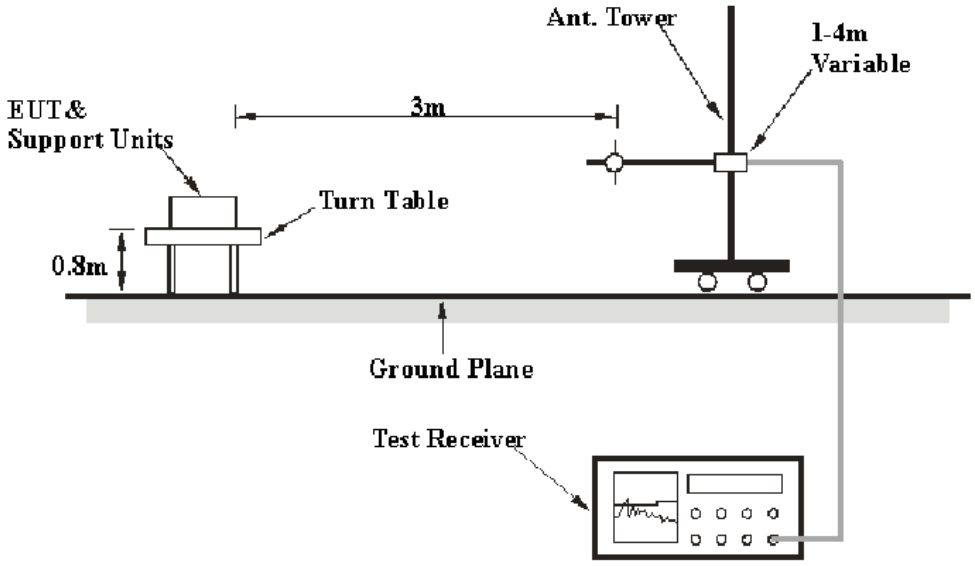
RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000MHz:

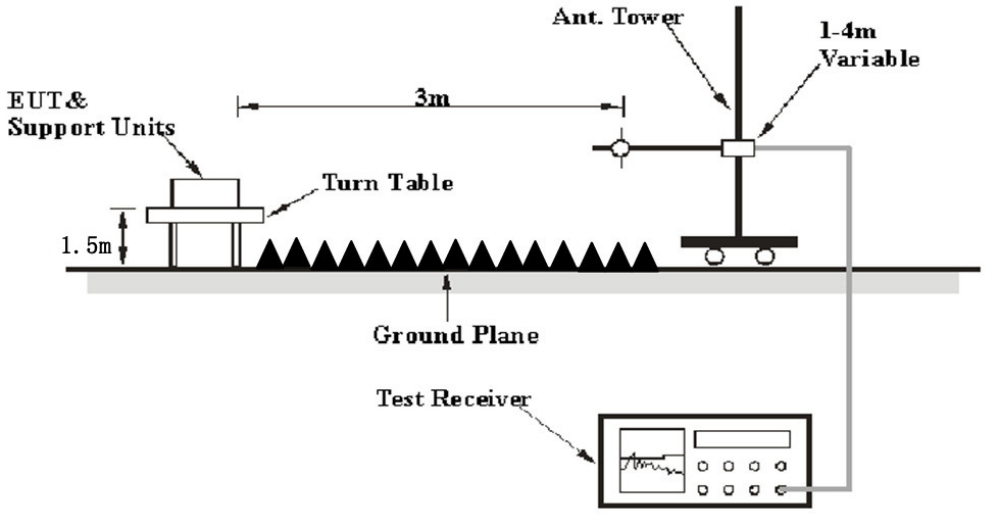
Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission and out of band emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

Test Procedure

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 above ground plane for below 1GHz or 1.5 meter for above 1GHz, 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.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

Test Results Summary

According to the EUT complied with the FCC Part 15.205, 15.209 & §15.249

Test Data

Environmental Conditions

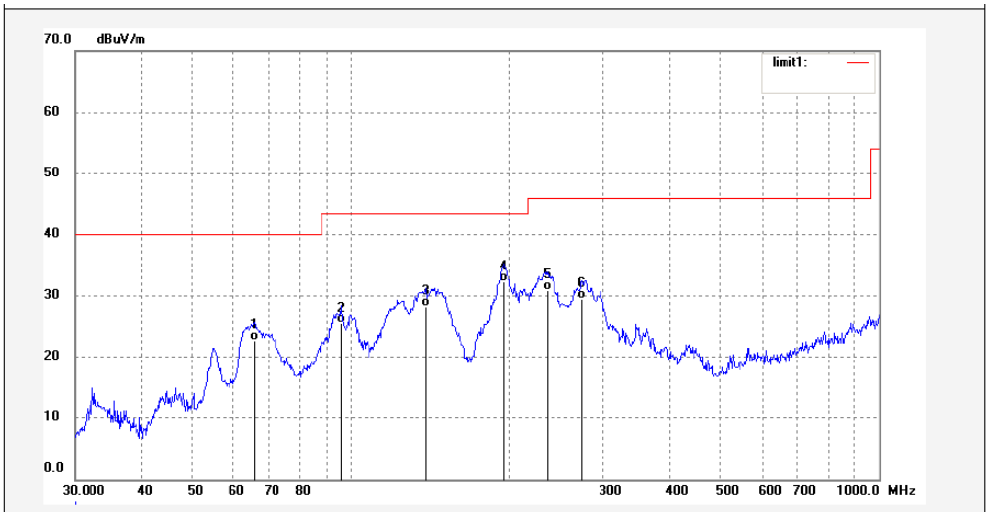
Temperature:	20~25 ℃
Relative Humidity:	45~50 %
ATM Pressure:	103.0 kPa

The testing was performed by Ting Lv on 2021-10-08 and 2021-10-22.

Test Mode: Transmitting

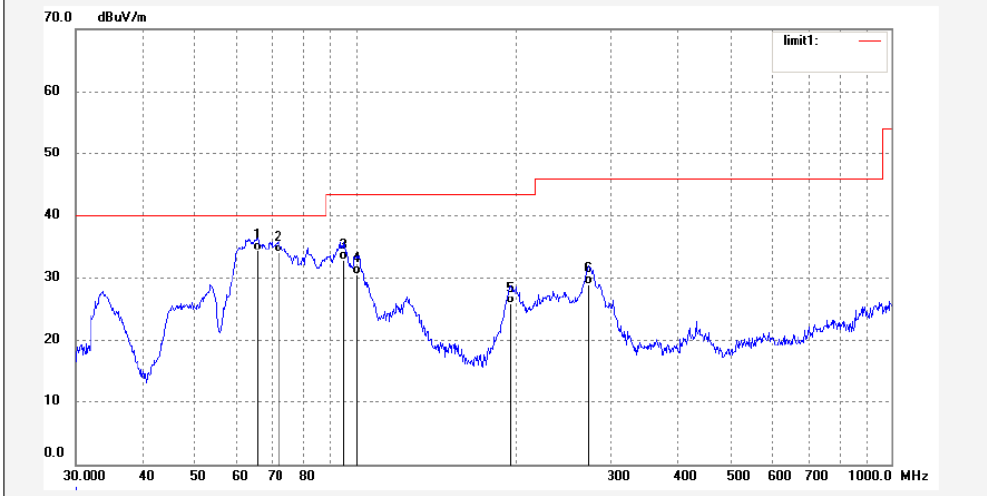
30MHz-1GHz: *(worst case is low channel)*

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	65.5725	42.06	-19.35	22.71	40.00	-17.29	QP			
2	95.7622	44.91	-19.51	25.40	43.50	-18.10	QP			
3	138.3873	48.09	-19.78	28.31	43.50	-15.19	QP			
4	193.7728	49.89	-17.66	32.23	43.50	-11.27	QP			
5	234.9909	47.51	-16.58	30.93	46.00	-15.07	QP			
6	273.2341	44.99	-15.51	29.48	46.00	-16.52	QP			

Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	65.5725	54.99	-20.54	34.45	40.00	-5.55	QP			
2	71.5806	55.16	-21.12	34.04	40.00	-5.96	QP			
3	94.7600	52.60	-19.77	32.83	43.50	-10.67	QP			
4	100.2286	48.67	-18.14	30.53	43.50	-12.97	QP			
5	194.4533	43.38	-17.64	25.74	43.50	-17.76	QP			
6	271.3245	44.63	-15.62	29.01	46.00	-16.99	QP			

1-40 GHz:

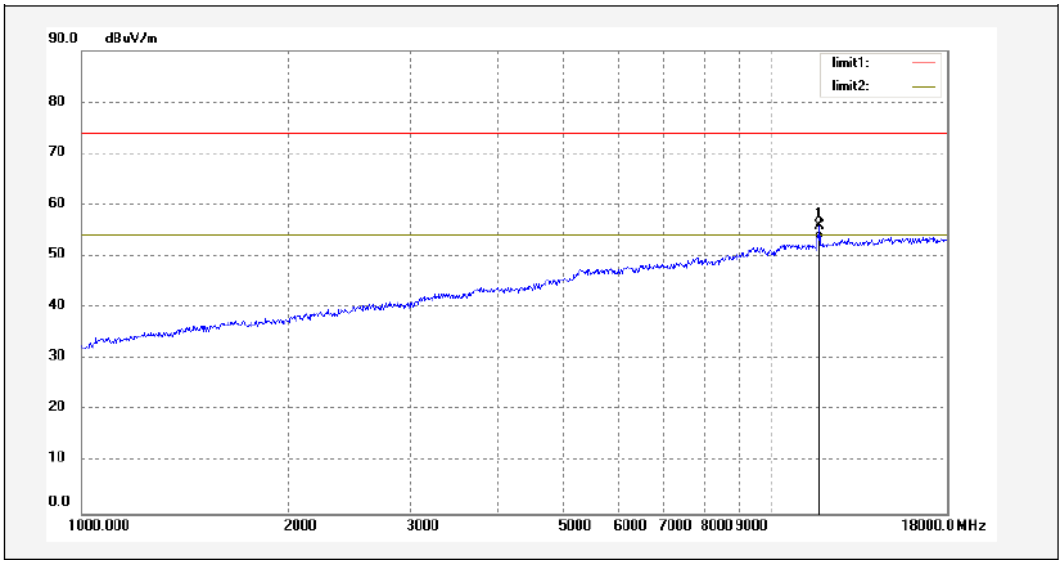
Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	Reading (dBuV)	PK/Ave		Height (m)	Polar (H/V)				
Low Channel (5726 MHz)									
5726	82.69	PK	40	1.6	H	3.96	86.65	114	-27.35
5726	71.9	Ave	40	1.6	H	3.96	75.86	94	-18.14
5726	82.57	PK	288	1.5	V	3.96	86.53	114	-27.47
5726	72.5	Ave	288	1.5	V	3.96	76.46	94	-17.54
5725	52.38	PK	88	1.6	H	3.97	56.35	74	-17.65
5725	39.92	Ave	88	1.6	H	3.97	43.89	54	-10.11
5725	52.55	PK	197	1.9	V	3.97	56.52	74	-17.48
5725	38.8	Ave	197	1.9	V	3.97	42.77	54	-11.23
11452	37.1	PK	118	1.6	H	14.87	51.97	74	-22.03
11452	38.01	PK	197	1.7	V	14.87	52.88	74	-21.12
Middle Channel (5800 MHz)									
5800	82.34	PK	279	2.1	H	4.19	86.53	114	-27.47
5800	71.26	Ave	279	2.1	H	4.19	75.45	94	-18.55
5800	82.22	PK	274	1.7	V	4.19	86.41	114	-27.59
5800	72.46	Ave	274	1.7	V	4.19	76.65	94	-17.35
11600	37.85	PK	190	2.0	H	14.59	52.44	74	-21.56
11600	39.27	PK	247	2.2	V	14.59	53.86	74	-20.14
High Channel (5874 MHz)									
5874	82.43	PK	51	1.6	H	4.4	86.83	114	-27.17
5874	72.35	Ave	51	1.6	H	4.4	76.75	94	-17.25
5874	82.28	PK	107	2.0	V	4.4	86.68	114	-27.32
5874	72.49	Ave	107	2.0	V	4.4	76.89	94	-17.11
5875	45.34	PK	337	1.7	H	4.41	49.75	74	-24.25
5875	27.4	Ave	337	1.7	H	4.41	31.81	54	-22.19
5875	46.05	PK	298	1.7	V	4.41	50.46	74	-23.54
5875	27.45	Ave	298	1.7	V	4.41	31.86	54	-22.14
11748	41.61	PK	322	1.6	H	14.35	55.96	74	-18.04
11748	38.77	Ave	90	2.0	H	14.35	53.12	54	-0.88
11748	38.74	PK	90	2.0	V	14.35	53.09	74	-20.91

Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Corrected. Amplitude - Limit
The other spurious emission which is 20dB to the limit was not recorded.
The test result of peak was less than the limit of average, so just peak values were recorded.

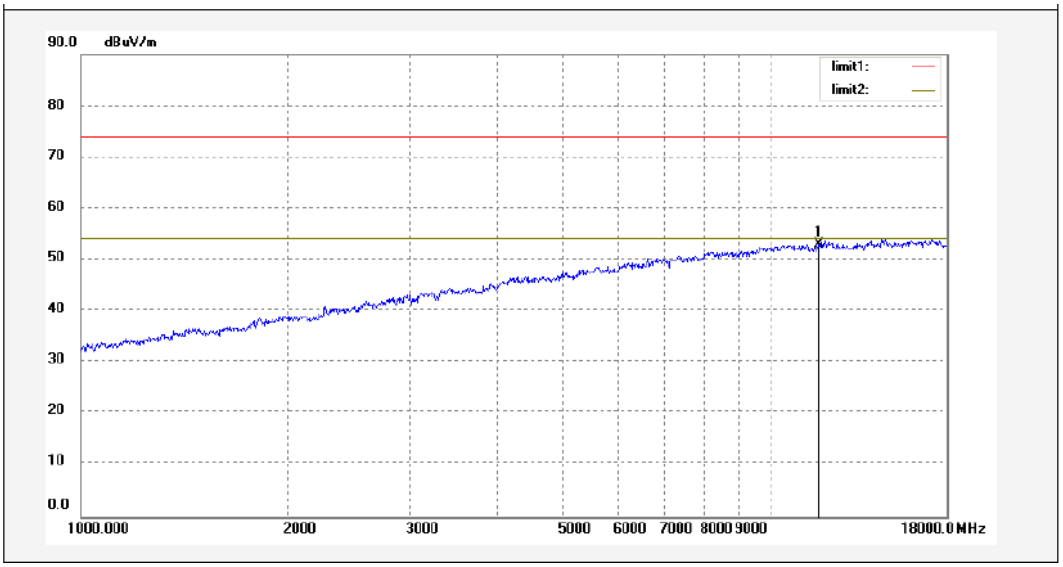
18~40GHz: The test values lower than the limits of 20dB or in the noise floor level, the test data were not recorded in the report.

Pre-scan with high channel Peak
1-18GHz

Horizontal

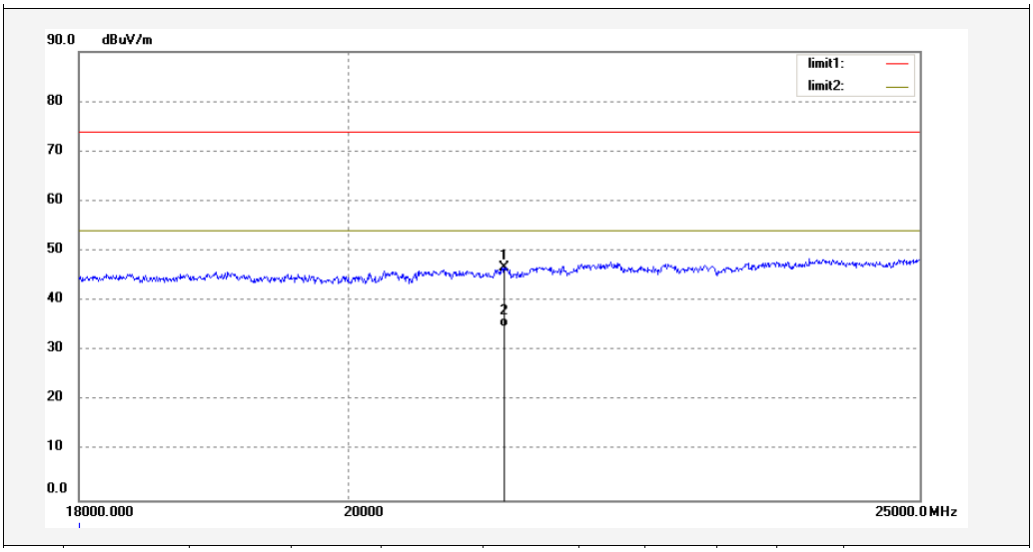


Vertical



Pre-scan with high channel Peak
18-25GHz

Horizontal



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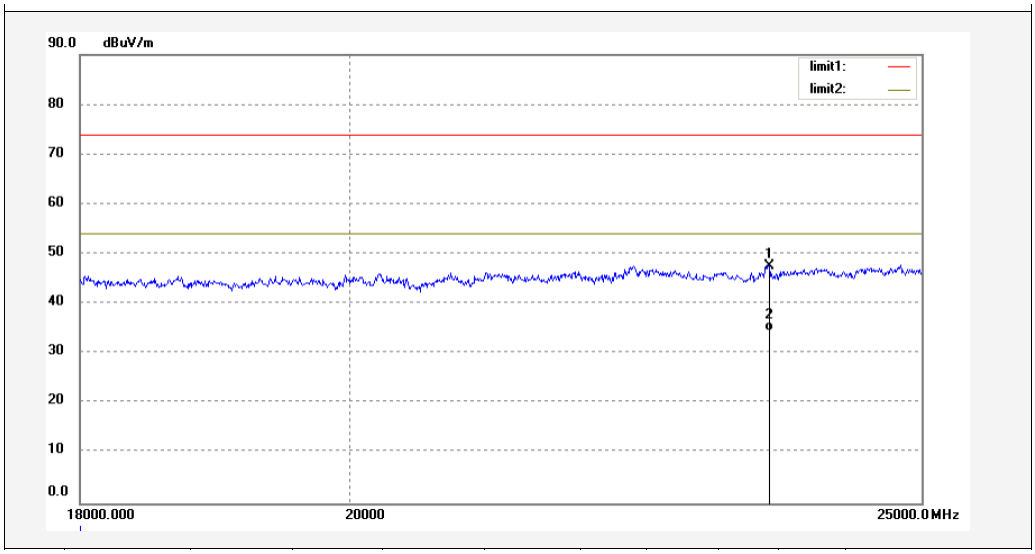
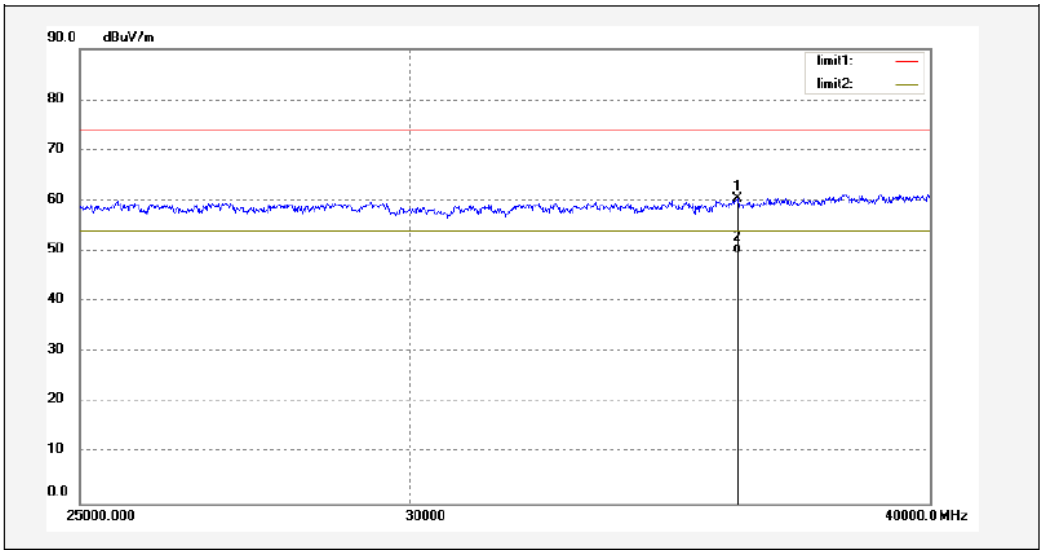


Pre-scan with high channel Peak
18-40GHz

Horizontal



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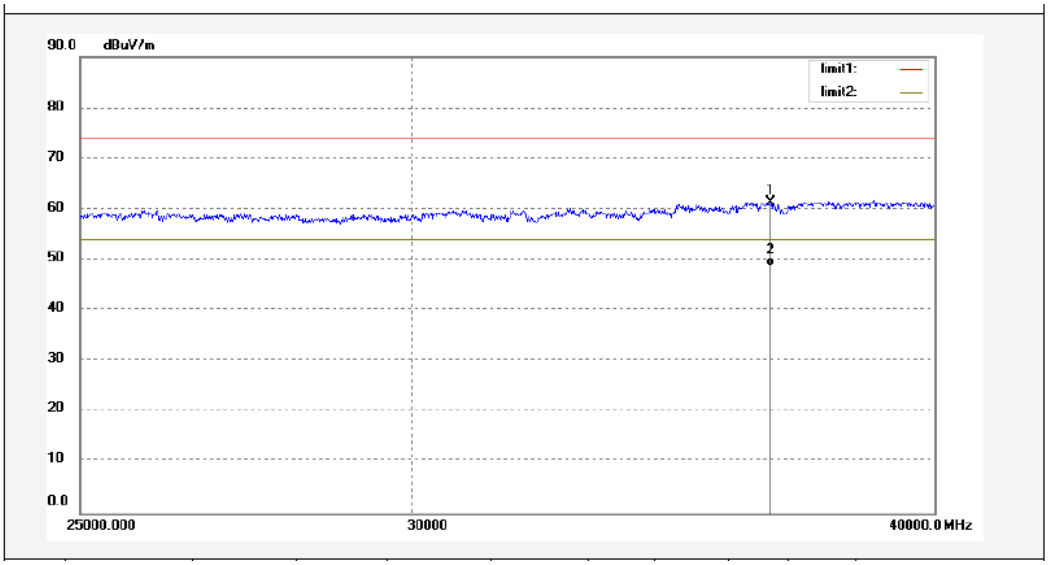


FCC§15.215(c) - 20dB EMISSION BANDWIDTH

Applicable Standard

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

3. Measure the frequency difference of two frequencies that indicated 20dB bandwidth.

4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	25.6 ℃
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Ting Lv on 2021-10-25 and 2021-11-04.

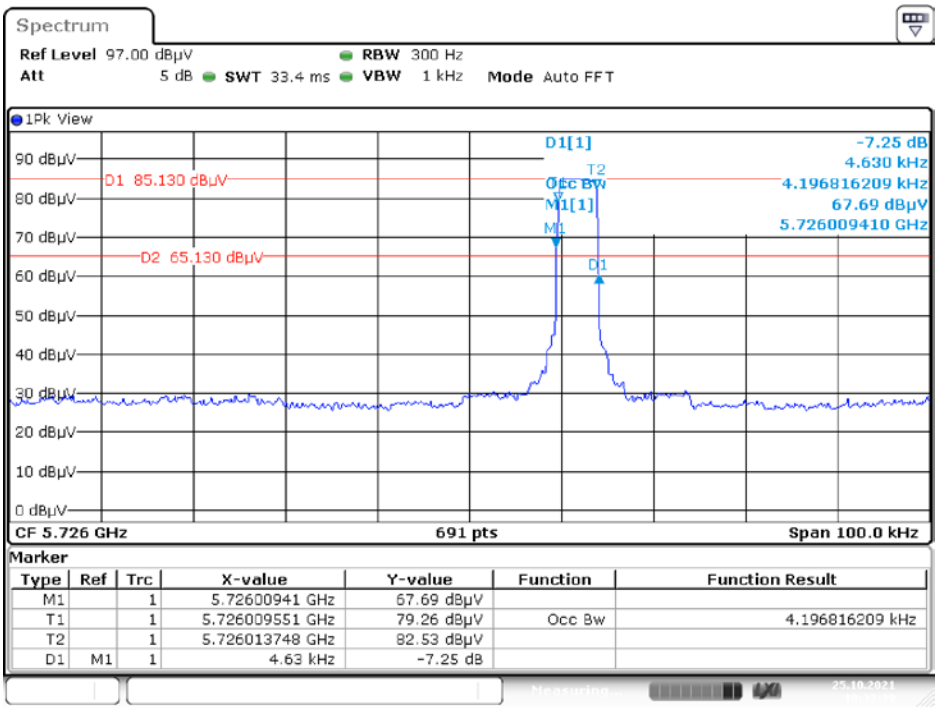
Test Mode: Transmitting

Please refer to the following table and plots.

Channel	Frequency (MHz)	20dB Bandwidth (kHz)
Low	5726	4.63
Middle	5800	3.04
High	5874	5.93

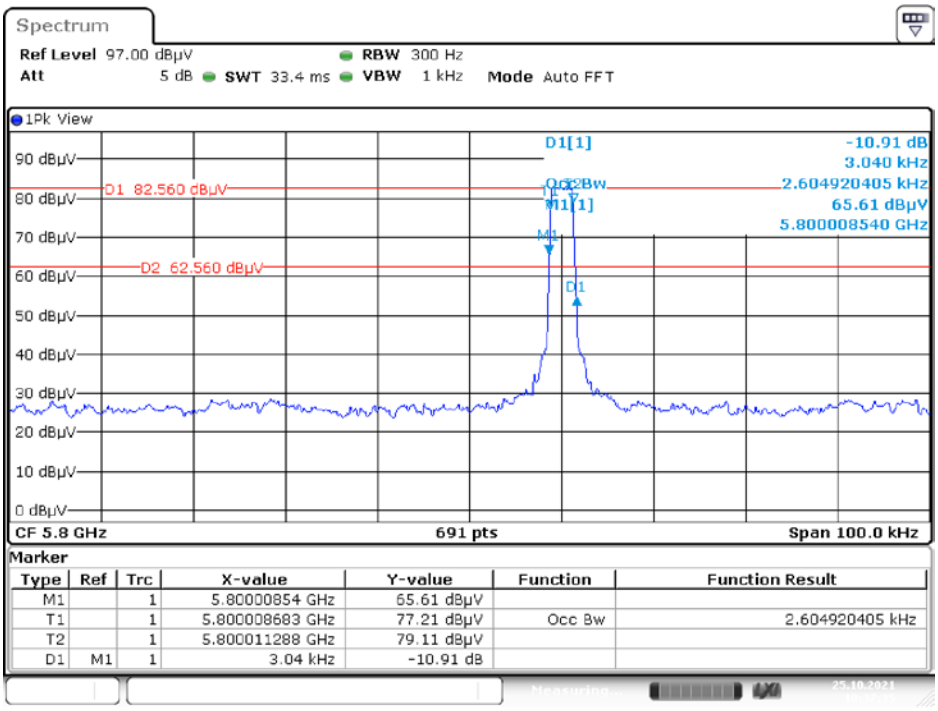
Mode	20dB Bandwidth (MHz)
Swept-frequency	149.4

Low Channel



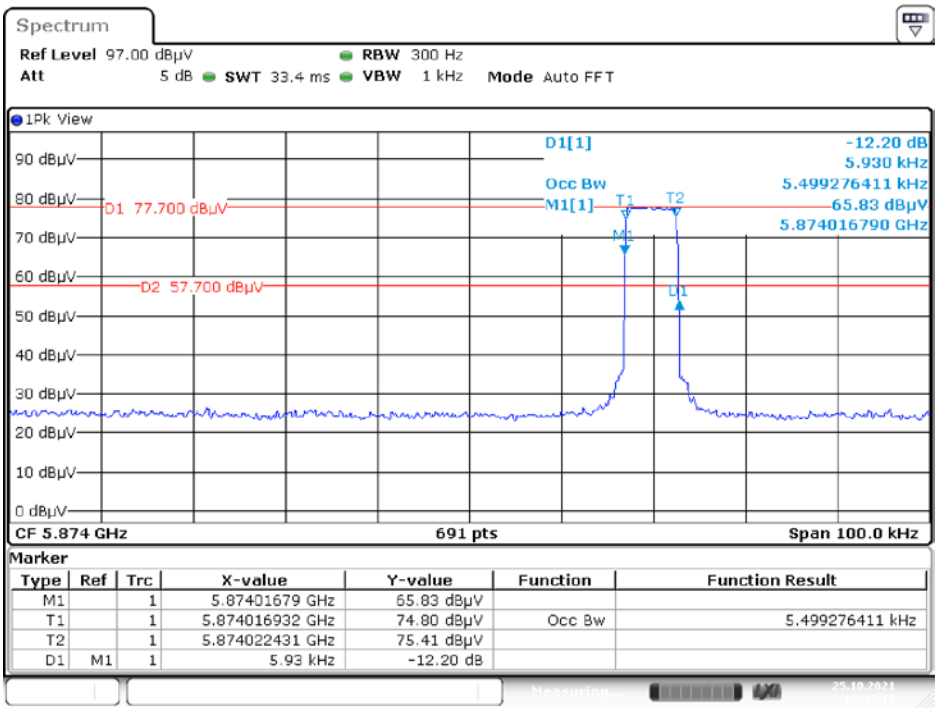
Date: 25.OCT.2021 10:33:39

Middle Channel



Date: 25.OCT.2021 10:37:35

High Channel



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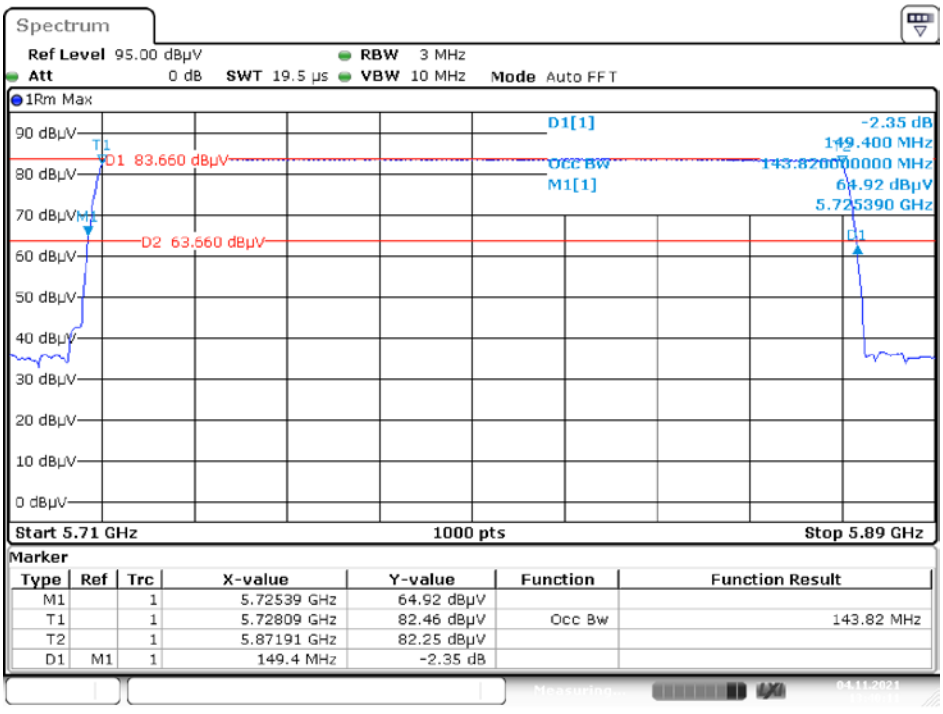
Swept-frequency mode



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