

FCC 47 CFR PART 15.255

TEST REPORT

For

K60168 Mini Dongle

Model: K60168-P

Trade Name: KaiKuTeK

Issued to
KaiKuTeK.Inc
9F., No. 3-2, Park St., Nangang Dist., Taipei City 115010, Taiwan (R.O.C.)

Issued by
Compliance Certification Services Inc.
Wugu Laboratory
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City, Taiwan. (R.O.C.)
Issued Date: April 7, 2021

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	April 7, 2021	Initial Issue	ALL	Doris Chu

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1. TEST RESULT CERTIFICATION

Applicant: KaiKuTeK.Inc
9F., No. 3-2, Park St., Nangang Dist., Taipei City 115010,
Taiwan (R.O.C.)

Manufacturer: KaiKuTeK.Inc
9F., No. 3-2, Park St., Nangang Dist., Taipei City 115010,
Taiwan (R.O.C.)

Equipment Under Test: K60168 Mini Dongle

Trade Name: KaiKuTeK

Model: K60168-P

Date of Test: March 8 ~ 13, 2021

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15.255	No non-compliance noted
Statements of Conformity	
Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

We hereby certify that:

All test results conform to above mentioned standards.

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.255.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:



Kevin Tsai
Deputy Manager

2. EUT DESCRIPTION

Product	K60168 Mini Dongle
Trade Name	KaiKuTeK
Model Number	K60168-P
Model Discrepancy	N/A
Received Date	February 24, 2021
Power Supply	Power from host device. (DC 5V)
Frequency Band	57-64 GHz
Modulation	FMCW
Number of Channel	1
Antenna Designation	Patch antenna / Gain:8.8dBi
Temperature Range	0°C to +85 °C

Remark:

1. The sample selected for test was production product and was provided by manufacturer.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

3. TEST SUMMARY

Report Section	FCC Standard Section	Test Item	Result
8.1	15.255(c)	Out Power & EIRP	Pass
8.2	15.255(d)	Radiated Spurious Emissions	Pass
8.3	15.255(f)	Frequency Stability	Pass

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 , ANSI 63.4 2014 and FCC CFR 47 Part 15.255.

4.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

4.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in ANSI C63.10: 2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 1.5 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10: 2013.

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4.4 DESCRIPTION OF TEST MODES

The EUT (model: K60168-P) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed. The worst case data rate is determined as the data rate with highest output power.

The product does not transmits in stop condition.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT power by Host System
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Worst Position	<input type="checkbox"/> Placed in fixed position. <input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by Host System
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(X-Plane) were recorded in this report

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5. INSTRUMENT CALIBRATION

5.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

5.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year.

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Coaxial Cable	Woken	WC12	CC001	06/29/2020	06/28/2021
Coaxial Cable	Woken	WC12	CC003	06/29/2020	06/28/2021
Horn Antenna / Harmonic Mixer	ROHDE&SCHWARZ	FH-PP-110 / FS-Z110	10003 / 100096	12/09/2019	12/08/2021
Horn Antenna / Harmonic Mixer	A-INFOMW / ROHDE&SCHWARZ	LB-19-20-A / FS-Z60	J202020872 / 100142	12/09/2019	12/08/2021
Horn Antenna / Harmonic Mixer	ROHDE&SCHWARZ	FH-PP-75 / FS-Z75	10001 / 100162	12/09/2019	12/08/2021
Signal Analyzer	R&S	FSV 40	101073	09/17/2020	09/16/2021
Thermostatic/Humidity Chamber	TAICHY	MHG-150LF	930619	09/24/2020	09/23/2021
Software	N/A				

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3M 966 Chamber Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Band Reject Filters	MICRO TRONICS	BRM 50702	120	02/25/2021	02/24/2022
Bilog Antenna	Sunol Sciences	JB3	A030105	07/24/2020	07/23/2021
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/25/2021	02/24/2022
Coaxial Cable	EMCI	EMC105	190914+327 109/4	09/19/2020	09/18/2021
Horn Antenna / Harmonic Mixer	ROHDE&SCHWARZ	FH-PP-110 / FS-Z110	10003 / 100096	12/09/2019	12/08/2021
Horn Antenna / Harmonic Mixer	A-INFOMW / ROHDE&SCHWARZ	LB-19-20-A / FS-Z60	J202020872 / 100142	12/09/2019	12/08/2021
Horn Antenna / Harmonic Mixer	ROHDE&SCHWARZ	FH-PP-75 / FS-Z75	10001 / 100162	12/09/2019	12/08/2021
Horn Antenna / Spectrum Analyzer Mixer	Radiometer Physics GmbH	FH-PP-170 / SAM-170	10003 / 20011	12/09/2019	12/08/2021
Horn Antenna / Spectrum Analyzer Mixer	Radiometer Physics GmbH	FH-PP-220 / SAM-220	10003 / 20013	12/09/2019	12/08/2021
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/06/2021	01/05/2022
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02 003	09/30/2020	09/29/2021
Coaxial Cable	Woken	WC12	CC001	06/29/2020	06/28/2021
Coaxial Cable	Woken	WC12	CC003	06/29/2020	06/28/2021
Signal Analyzer	R&S	FSV 40	101073	09/17/2020	09/16/2021
K Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	12/09/2020	12/08/2021
K Type Cable	Huber+Suhner	SUCOFLEX 102	22470/2	12/09/2020	12/08/2021
Loop Ant	COM-POWER	AL-130	121051	03/27/2020	03/26/2021
Pre-Amplifier	EMEC	EM330	060609	02/25/2021	02/24/2022
Pre-Amplifier	EMEC	EM01G26G	060570	06/29/2020	06/28/2021
Pre-Amplifier	MITEQ	AMF-6F-180040 00-37-8P	985646	09/02/2020	09/01/2021
PSA Series Spectrum Analyzer	Agilent	E4446A	MY4618032 3	07/24/2020	07/23/2021
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	e3 6.11-20180413				

5.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 6dB bandwidth	+/- 0.0014
RF output power, conducted	+/- 1.14
Power density, conducted	+/- 1.40
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87
3M Semi Anechoic Chamber / 40G~60G	+/- 4.62
3M Semi Anechoic Chamber / 60G~75G	+/- 3.59
3M Semi Anechoic Chamber / 75G~110G	+/- 4.34
3M Semi Anechoic Chamber / 110G~170G	+/- 4.67
3M Semi Anechoic Chamber / 170G~220G	+/- 5.01

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

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6. FACILITIES AND ACCREDITATIONS

6.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)

Tel: 886-2-2299-9720 / Fax: 886-2-2299-9721

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

6.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

7.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID
1.	NB(J)	TOSHIBA	PT345T-00L002	N/A	PD97260H

Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

8. TEST REQUIREMENTS

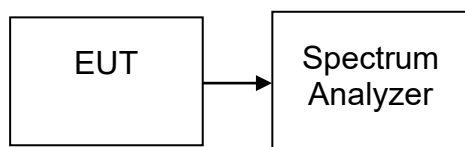
8.1 OUTPUT POWER & EIRP

LIMIT

Within the 57-71 GHz band, emission levels shall not exceed the following equivalent isotropically radiated power (EIRP):

For fixed field disturbance sensors other than those operating under the provisions of paragraph (c)(2) of this section, and short-range devices for interactive motion sensing, the peak transmitter conducted output power shall not exceed -10 dBm and the peak EIRP level shall not exceed 10 dBm.

Test Configuration



TEST RESULTS

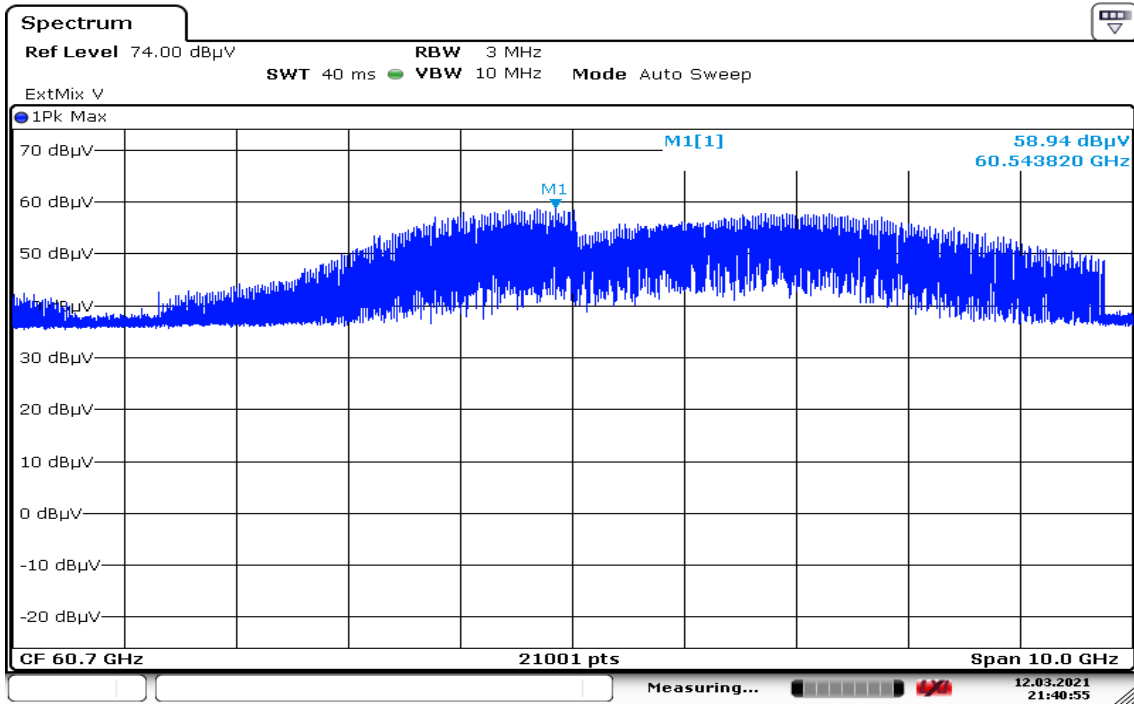
No non-compliance noted.

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Test Data

Temperature: 21.9°C Test date: March 12, 2021
Humidity: 53% RH Tested by: Ray Li

Frequency (GHz)	Spectrum Reading (dBuV)	Antenna Factor (dB/m)	Distance (m)	dBuV/m	E.I.R.P. (dBm)	Limit (dBm)	Detector
60.54382	58.94	43.43	1	102.37	-2.427371	<= 10	Peak
					E.R.P. (dBm)	Limit (dBm)	Detector
					-11.22737	<= -10	Peak



Date: 12.MAR.2021 21:40:55

8.2 SPURIOUS EMISSIONS

8.2.1 Radiated Emissions

LIMIT

1. According to FCC PART 15.255(d), Radiated emissions below 40 GHz shall not exceed the field strength as shown in the following emissions table.

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

2. Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm² at a distance of 3 meters.
3. The levels of the spurious emissions shall not exceed the level of the fundamental emission.

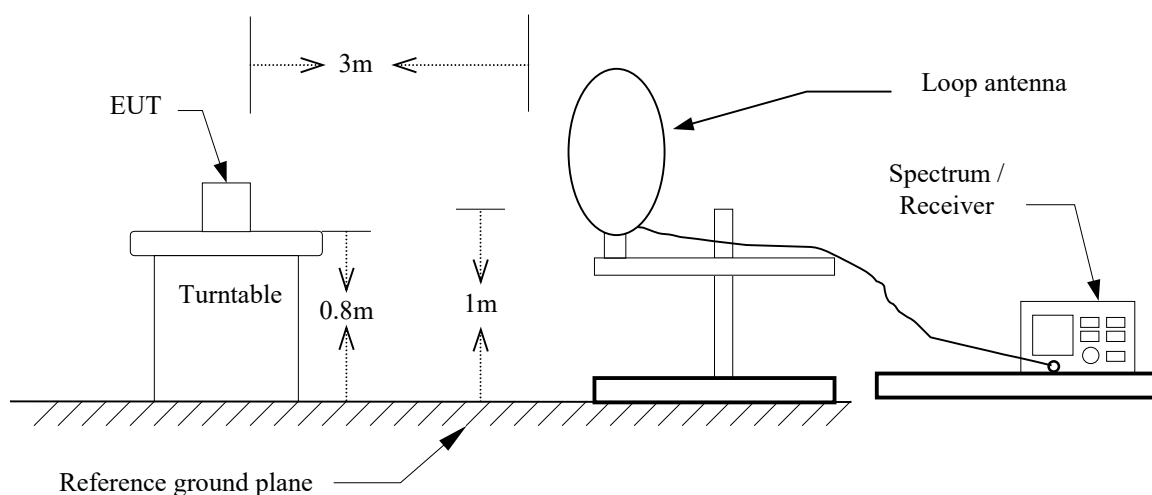
Notes:

$$90 \text{ pW/cm}^2 = \{ [(90/10^8) * 377] ^{0.5} \} * 10^6 = 18420.10 \text{ uV/m}$$

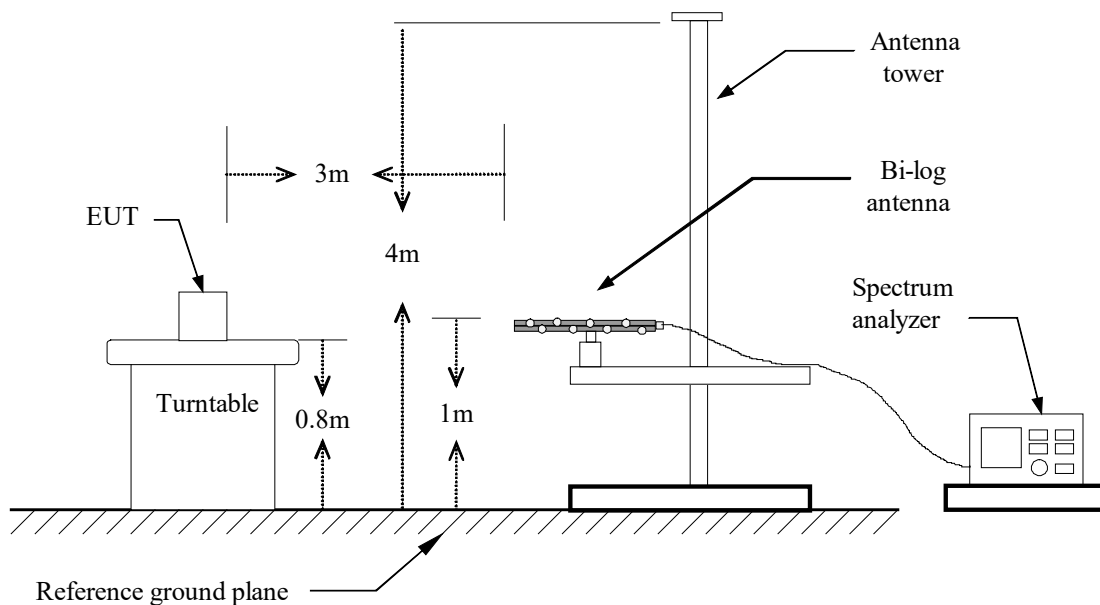
$$20\text{Log} (18420.0977196105) = 85.30 \text{ dBuV/m @ 3m}$$

Test Configuration

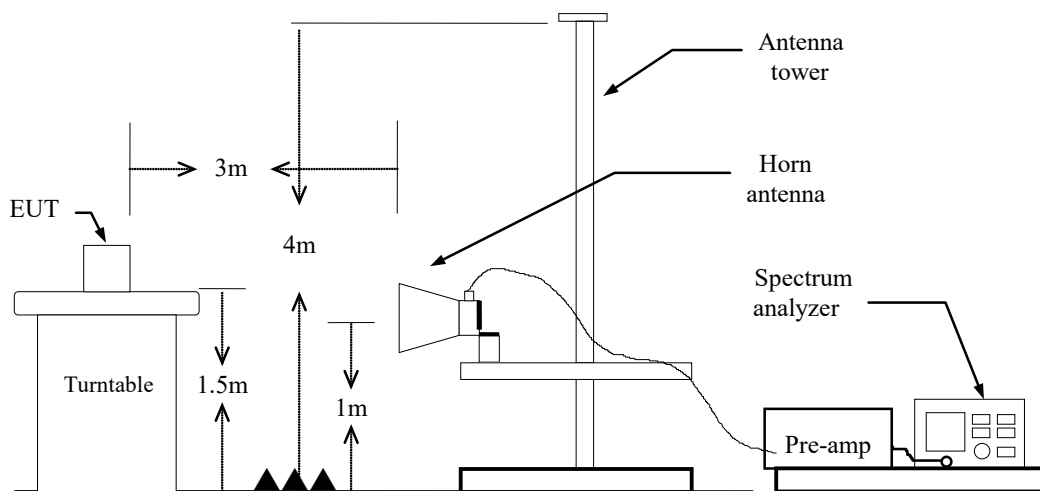
9kHz ~ 30MHz



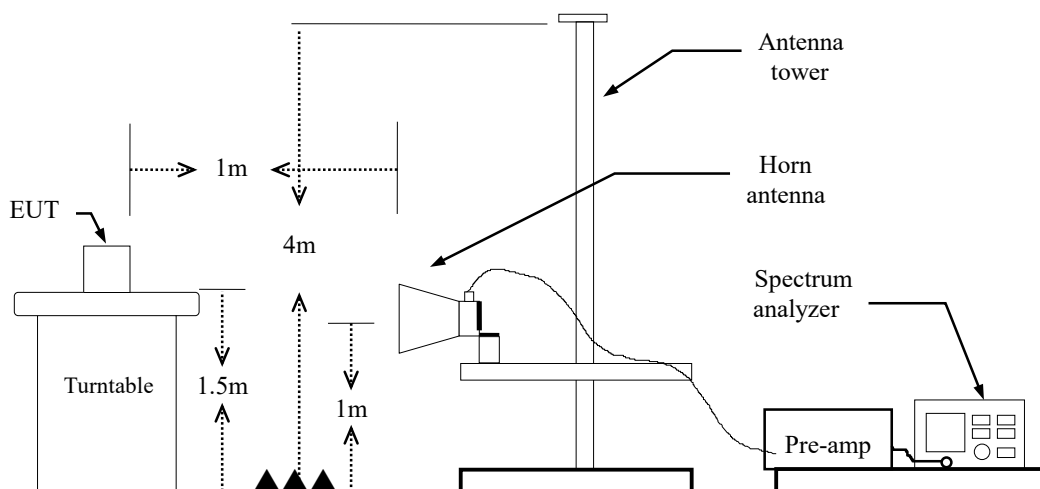
30MHz ~ 1 GHz



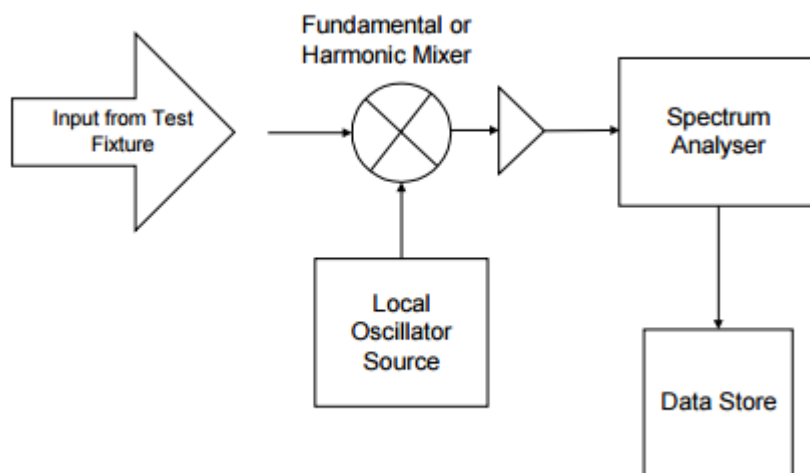
Above 1 GHz ~ 18GHz



18GHz ~ 40GHz



Above 40 GHz



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TEST PROCEDURE

1. The EUT is placed on a turntable, which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
Below 1GHz:
RBW=100kHz / VBW=300kHz / Sweep=AUTO
Above 1GHz:
(a)PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
(b)AVERAGE: RBW=1MHz,
Above 40GHz:
RBW = 1 MHz, VBW= 3 MHz,
Detector = Peak, Trace mode = max hold, Sweep = AUTO.
7. Repeat above procedures until the measurements for all frequencies are complete.

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Below 1 GHz

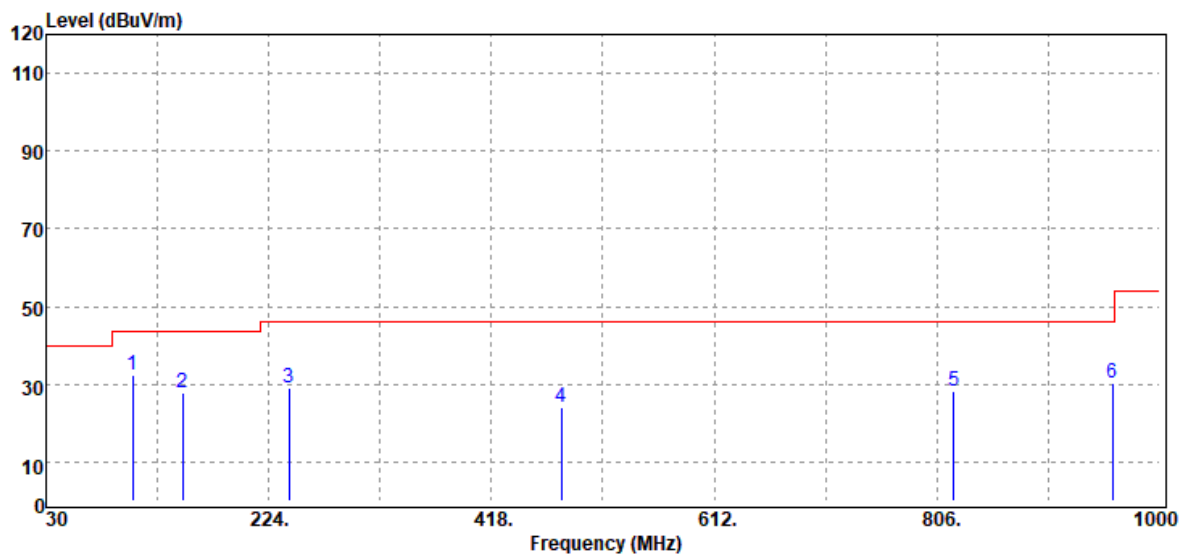
Operation Mode: TX CH Mid **Polarity:** Ver. / Hor.
Temperature: 21.4°C **Tested by:** Ray Li
Humidity: 59% RH **Test Date:** March 8, 2021

Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB	Ant. Pol. (H/V)
105.66	Peak	43.56	-11.23	32.33	43.50	-11.17	V
149.31	Peak	38.39	-10.40	27.99	43.50	-15.51	V
241.46	Peak	39.87	-10.75	29.12	46.00	-16.88	V
479.11	Peak	27.43	-3.39	24.04	46.00	-21.96	V
820.55	Peak	26.22	2.02	28.24	46.00	-17.76	V
959.26	Peak	26.42	3.76	30.18	46.00	-15.82	V
39.70	Peak	27.17	-9.65	17.52	40.00	-22.48	H
128.94	Peak	43.55	-9.10	34.45	43.50	-9.05	H
265.71	Peak	32.20	-9.33	22.87	46.00	-23.13	H
544.10	Peak	26.66	-2.40	24.26	46.00	-21.74	H
842.86	Peak	25.82	2.38	28.20	46.00	-17.80	H
959.26	Peak	26.75	3.76	30.51	46.00	-15.49	H

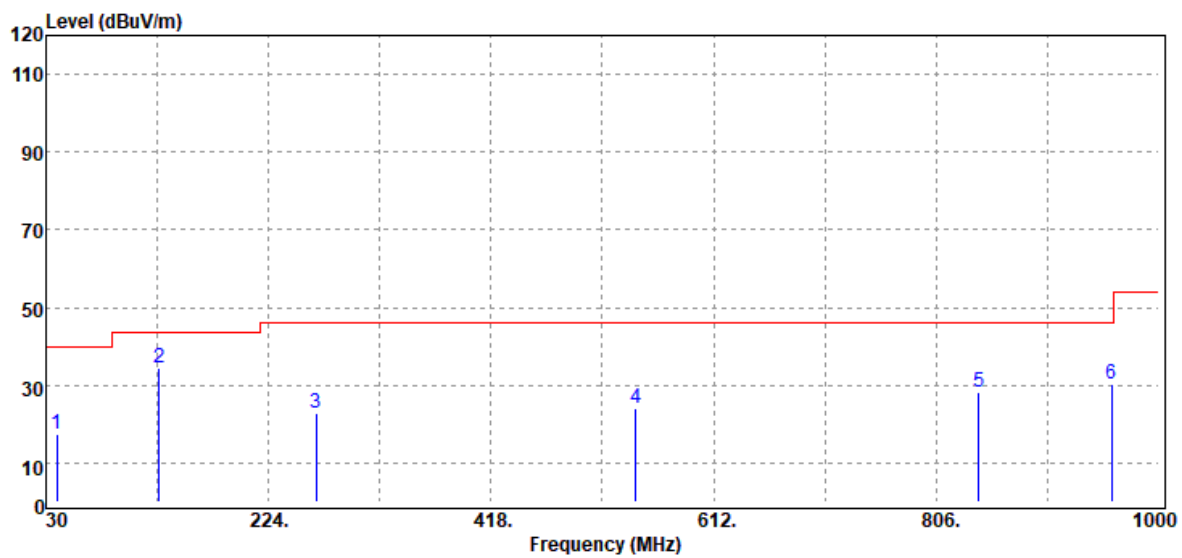
Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Remark result (dBUV/m) – Quasi-peak limit (dBUV/m).

Polarity : Vertical



Polarity : Horizontal



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Above 1 GHz

Operation Mode: TX CH Mid **Polarity:** Ver. / Hor.
Temperature: 21.4°C **Tested by:** Ray Li
Humidity: 59% RH **Test Date:** March 8, 2021

Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB	Ant. Pol. (H/V)
3747.70	Peak	34.99	9.74	44.73	74.00	-29.27	V
N/A							
3747.70	Peak	34.45	9.74	44.19	74.00	-29.81	H
N/A							

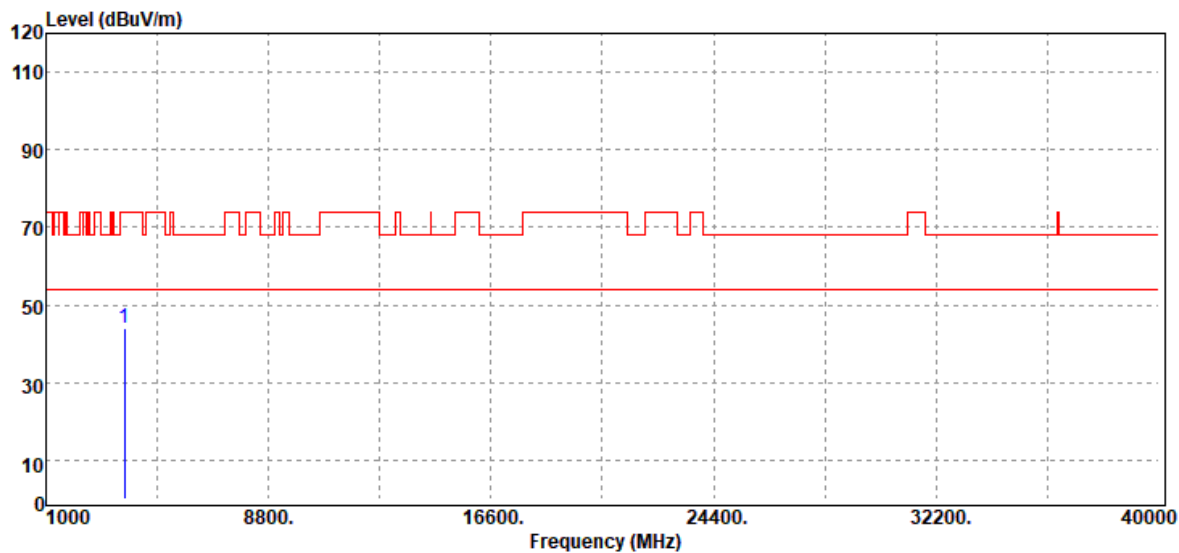
Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Polarity : Vertical



Polarity : Horizontal



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40GHz-50 GHz

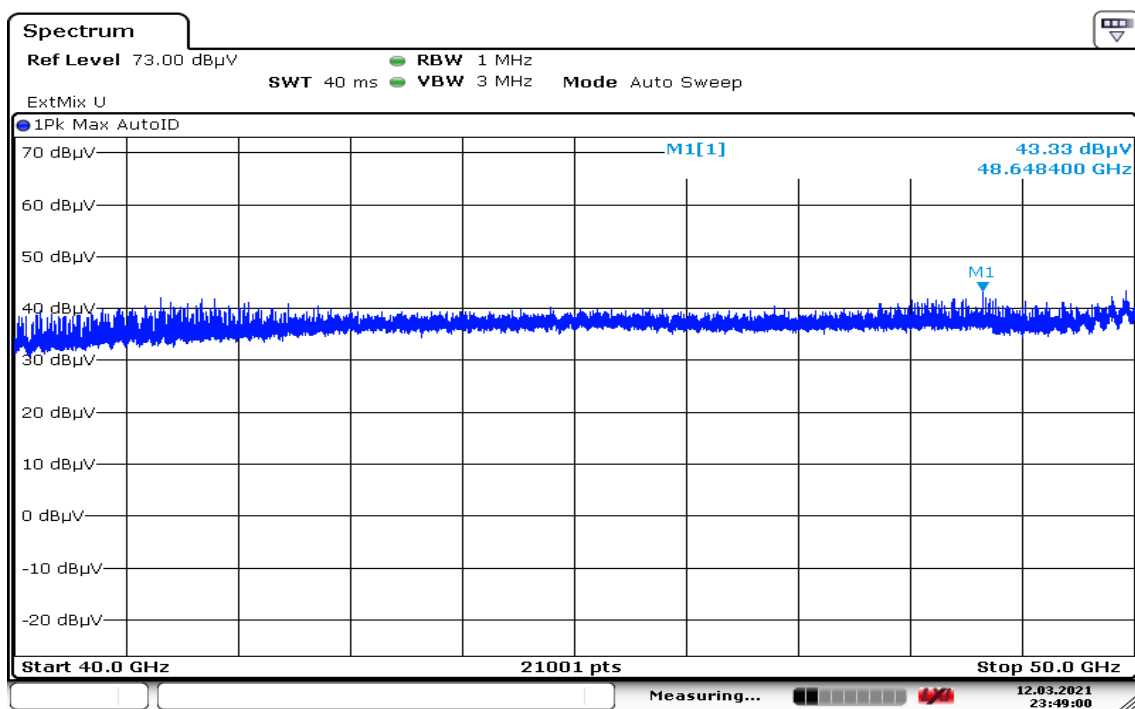
Operation Mode: Test Mode

Temperature: 21.9°C

Test date: March 12, 2021

Humidity: 53% RH

Tested by: Ray Li



Date: 12.MAR.2021 23:49:00

Frequency (GHz)	Spectrum Reading (dBuV)	Antenna Factor (dB/m)	Distance (m)	dBuV/m	Limit (dBuV/m)	Detector
48.6484	43.33	42.79	1	86.12	< 94.84	Peak

Remark:

1. dBuV/m = Spectrum Reading (dBuV) + Antenna Factor (dB/m)

2. 40GHz~200GHz Limit :

@ 3m Limit

$$\{ [(90/10^8) * 377]^0.5 \} * 10^6 = 18420.0977196105 \text{ uV/m}$$

$$20\text{Log}(18420.0977196105) = 85.30 \text{ dBuV}$$

@ 1m Limit = 85.30 + 20*Log(3/1) = 94.84 dBuV/m

@ 0.5m Limit = 85.30 + 20*Log(3/0.5) = 100.86 dBuV/m

@ 0.4m Limit = 85.30 + 20*Log(3/0.4) = 102.80 dBuV/m

@ 0.3m Limit = 85.30 + 20*Log(3/0.3) = 105.30 dBuV/m

@ 0.2m Limit = 85.30 + 20*Log(3/0.2) = 108.82 dBuV/m

@ 0.1m Limit = 85.30 + 20*Log(3/0.1) = 114.84 dBuV/m

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50GHz-75 GHz

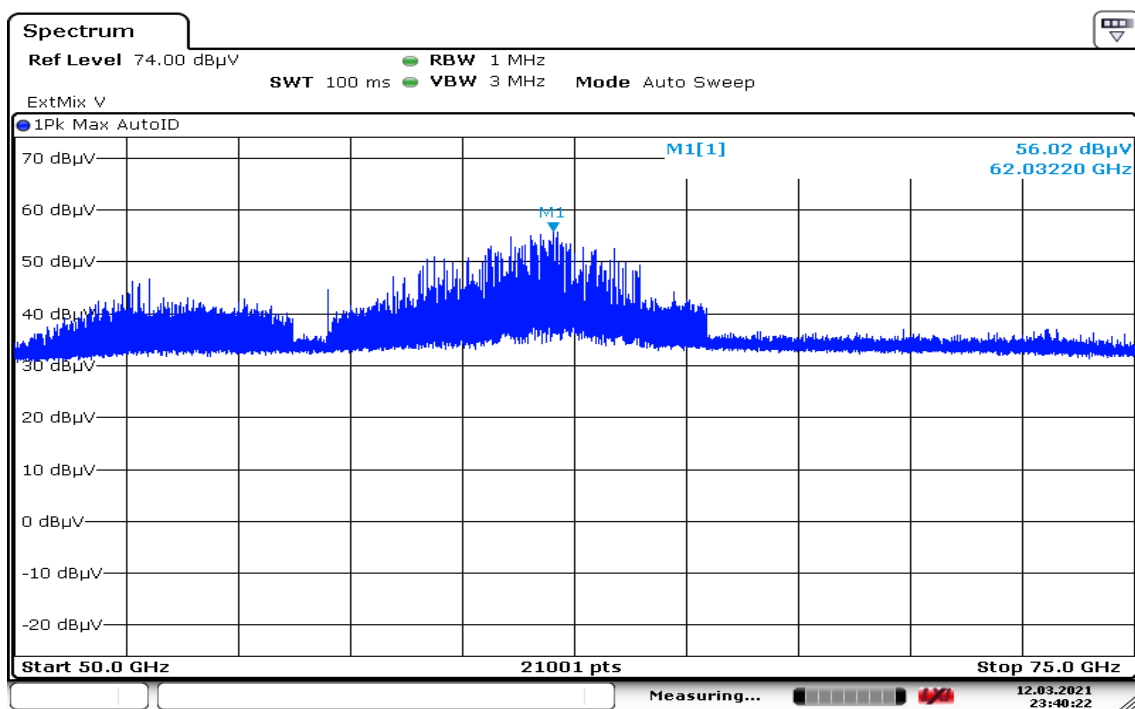
Operation Mode: Test Mode

Temperature: 21.9°C

Test date: March 12, 2021

Humidity: 53% RH

Tested by: Ray Li



Date: 12.MAR.2021 23:40:23

Frequency (GHz)	Spectrum Reading (dBuV)	Antenna Factor (dB/m)	Distance (m)	dBuV/m	Limit (dBuV/m)	Detector
62.0322	56.02	43.50	0.5	99.52	< 100.86	Peak

Remark:

1. dBuV/m = Spectrum Reading (dBuV) + Antenna Factor (dB/m)

2. 40GHz~200GHz Limit :

@ 3m Limit

$$\{ [(90/10^8) * 377]^0.5 \} * 10^6 = 18420.0977196105 \text{ uV/m}$$

$$20\text{Log}(18420.0977196105) = 85.30 \text{ dBuV}$$

@ 1m Limit = 85.30 + 20*Log(3/1) = 94.84 dBuV/m

@ 0.5m Limit = 85.30 + 20*Log(3/0.5) = 100.86 dBuV/m

@ 0.4m Limit = 85.30 + 20*Log(3/0.4) = 102.80 dBuV/m

@ 0.3m Limit = 85.30 + 20*Log(3/0.3) = 105.30 dBuV/m

@ 0.2m Limit = 85.30 + 20*Log(3/0.2) = 108.82 dBuV/m

@ 0.1m Limit = 85.30 + 20*Log(3/0.1) = 114.84 dBuV/m

Report No.: T210224W01-RP

75GHz-110 GHz

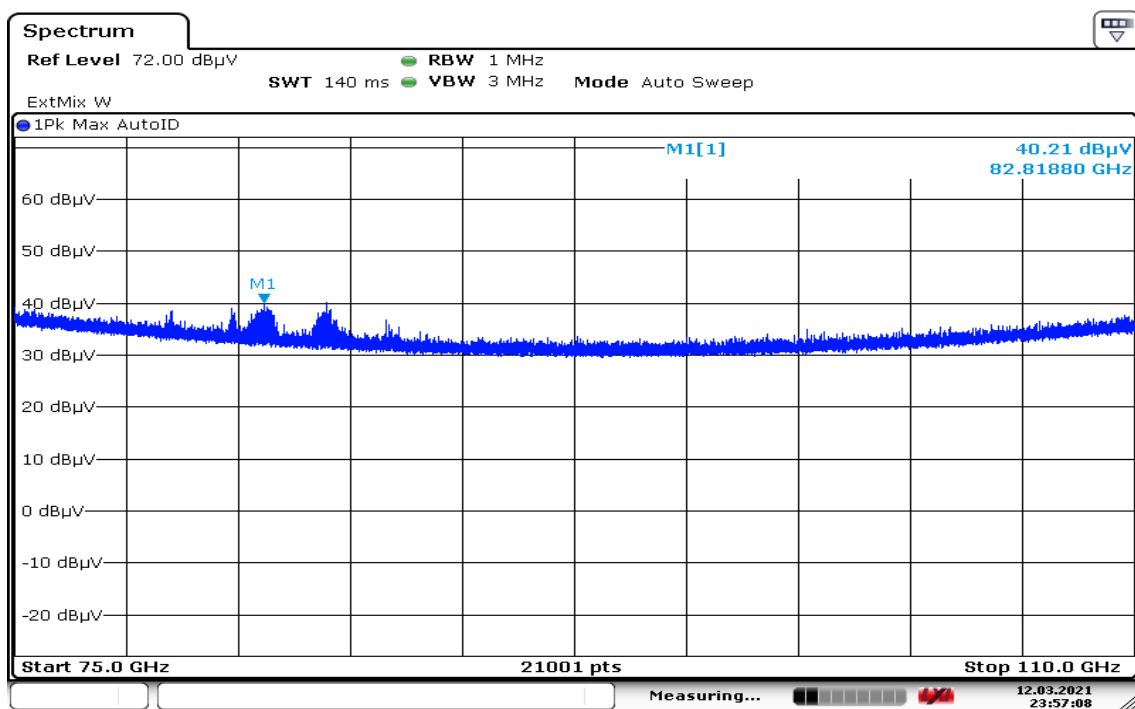
Operation Mode: Test Mode

Temperature: 21.9°C

Test date: March 12, 2021

Humidity: 53% RH

Tested by: Ray Li



Date: 12.MAR.2021 23:57:08

Frequency (GHz)	Spectrum Reading (dBuV)	Antenna Factor (dB/m)	Distance (m)	dBuV/m	Limit (dBuV/m)	Detector
82.8188	40.21	45.84	1	86.05	< 94.84	Peak

Remark:

1. dBuV/m = Spectrum Reading (dBuV) + Antenna Factor (dB/m)

2. 40GHz~200GHz Limit :

@ 3m Limit

$$\{ [(90/10^8) * 377]^0.5 \} * 10^6 = 18420.0977196105 \text{ uV/m}$$

$$20\text{Log}(18420.0977196105) = 85.30 \text{ dBuV}$$

@ 1m Limit = 85.30 + 20*Log(3/1) = 94.84 dBuV/m

@ 0.5m Limit = 85.30 + 20*Log(3/0.5) = 100.86 dBuV/m

@ 0.4m Limit = 85.30 + 20*Log(3/0.4) = 102.80 dBuV/m

@ 0.3m Limit = 85.30 + 20*Log(3/0.3) = 105.30 dBuV/m

@ 0.2m Limit = 85.30 + 20*Log(3/0.2) = 108.82 dBuV/m

@ 0.1m Limit = 85.30 + 20*Log(3/0.1) = 114.84 dBuV/m

Report No.: T210224W01-RP

110GHz-140 GHz

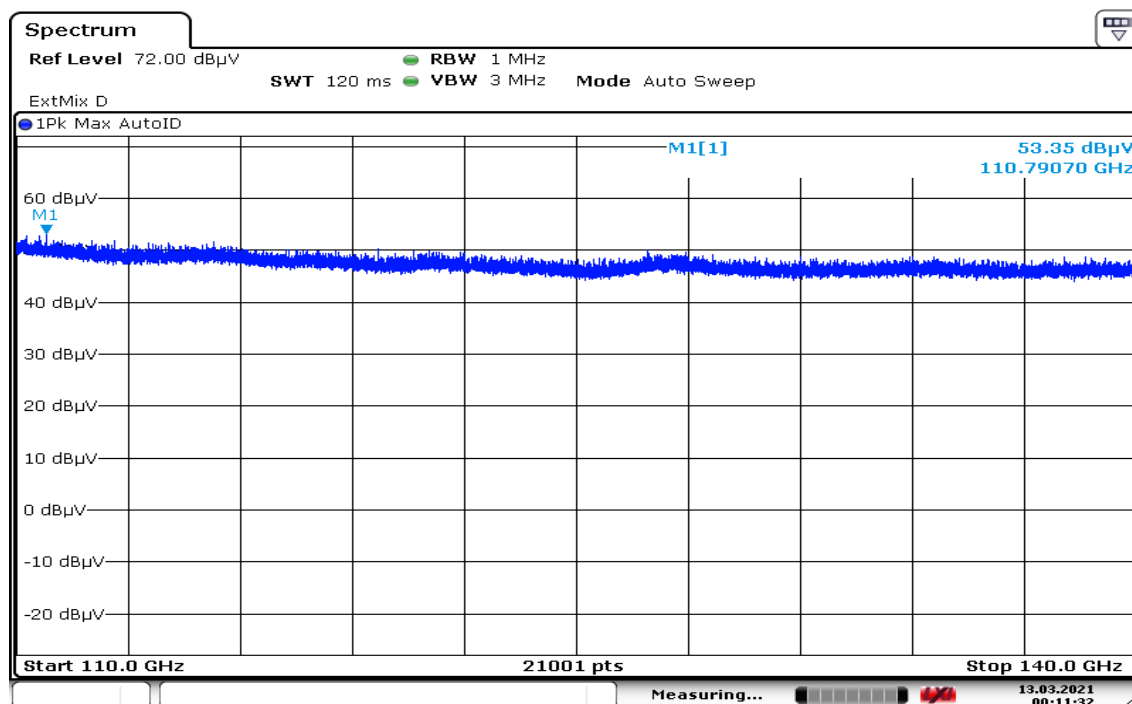
Operation Mode: Test Mode

Temperature: 22.3°C

Test date: March 13, 2021

Humidity: 59% RH

Tested by: Ray Li



Date: 13.MAR.2021 00:11:33

Frequency (GHz)	Spectrum Reading (dBuV)	Antenna Factor (dB/m)	Distance (m)	dBuV/m	Limit (dBuV/m)	Detector
110.7907	53.35	50.41	0.3	103.76	< 105.3	Peak

Remark:

- dBuV/m = Spectrum Reading (dBuV) + Antenna Factor (dB/m)
- 40GHz~200GHz Limit :

@ 3m Limit

$$\{ [(90/10^8) * 377]^2 * 10^6 \} = 18420.0977196105 \text{ uV/m}$$

$$20\text{Log}(18420.0977196105) = 85.30 \text{ dBuV}$$

@ 1m Limit = 85.30 + 20*Log(3/1) = 94.84 dBuV/m

@ 0.5m Limit = 85.30 + 20*Log(3/0.5) = 100.86 dBuV/m

@ 0.4m Limit = 85.30 + 20*Log(3/0.4) = 102.80 dBuV/m

@ 0.3m Limit = 85.30 + 20*Log(3/0.3) = 105.30 dBuV/m

@ 0.2m Limit = 85.30 + 20*Log(3/0.2) = 108.82 dBuV/m

@ 0.1m Limit = 85.30 + 20*Log(3/0.1) = 114.84 dBuV/m

Report No.: T210224W01-RP

140GHz -200GHz

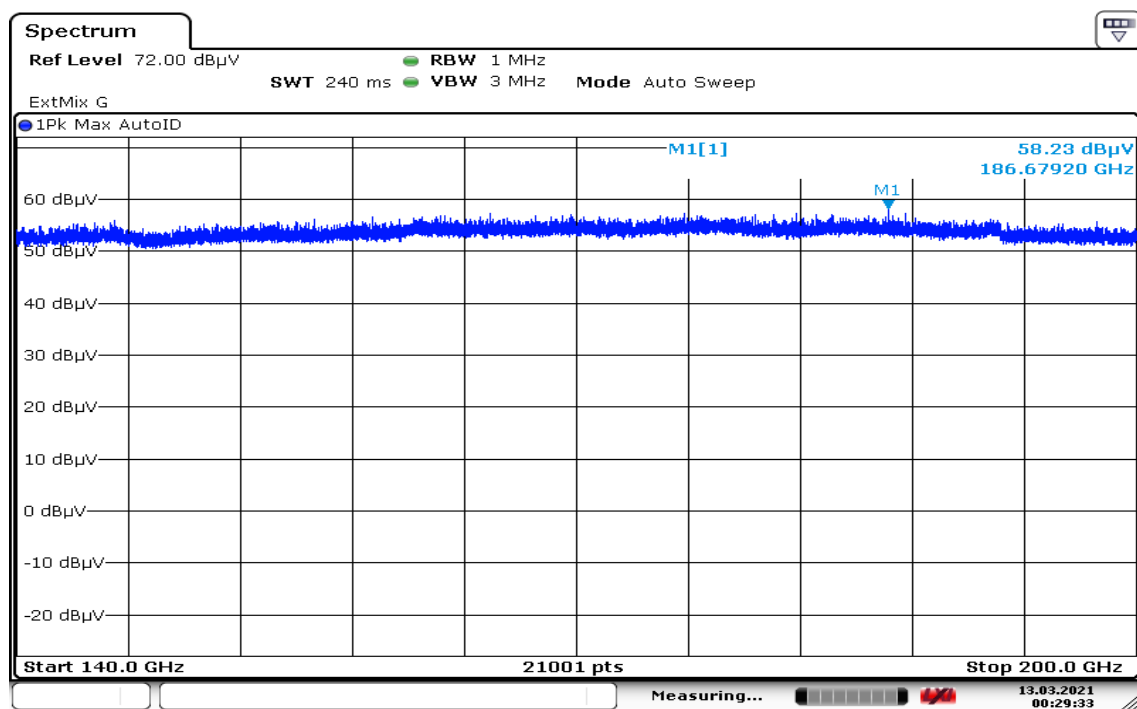
Operation Mode: Test Mode

Temperature: 22.3°C

Test date: March 13, 2021

Humidity: 59% RH

Tested by: Ray Li



Date: 13.MAR.2021 00:29:34

Frequency (GHz)	Spectrum Reading (dBuV)	Antenna Factor (dB/m)	Distance (m)	dBuV/m	Limit (dBuV/m)	Detector
186.6792	58.23	53.16	0.1	111.39	< 114.84	Peak

Remark:

1. dBuV/m = Spectrum Reading (dBuV) + Antenna Factor (dB/m)

2. 40GHz~200GHz Limit :

@ 3m Limit

$$\{ [(90/10^8) * 377]^0.5 \} * 10^6 = 18420.0977196105 \text{ uV/m}$$

$$20\text{Log}(18420.0977196105) = 85.30 \text{ dBuV}$$

@ 1m Limit = 85.30 + 20*Log(3/1) = 94.84 dBuV/m

@ 0.5m Limit = 85.30 + 20*Log(3/0.5) = 100.86 dBuV/m

@ 0.4m Limit = 85.30 + 20*Log(3/0.4) = 102.80 dBuV/m

@ 0.3m Limit = 85.30 + 20*Log(3/0.3) = 105.30 dBuV/m

@ 0.2m Limit = 85.30 + 20*Log(3/0.2) = 108.82 dBuV/m

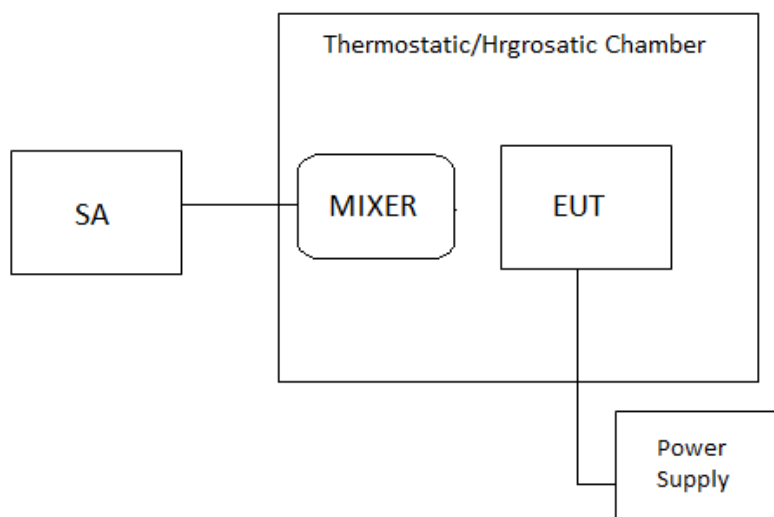
@ 0.1m Limit = 85.30 + 20*Log(3/0.1) = 114.84 dBuV/m

8.3 FREQUENCY STABILITY

LIMIT

According to FCC 15.255(f), Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range -20 to $+50$ degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

Test Configuration



TEST PROCEDURE

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -20°C . After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of $+50^{\circ}\text{C}$ reached.

TEST RESULTS

No non-compliance noted.

Temperature: 22.3°C

Test date: March 13, 2021

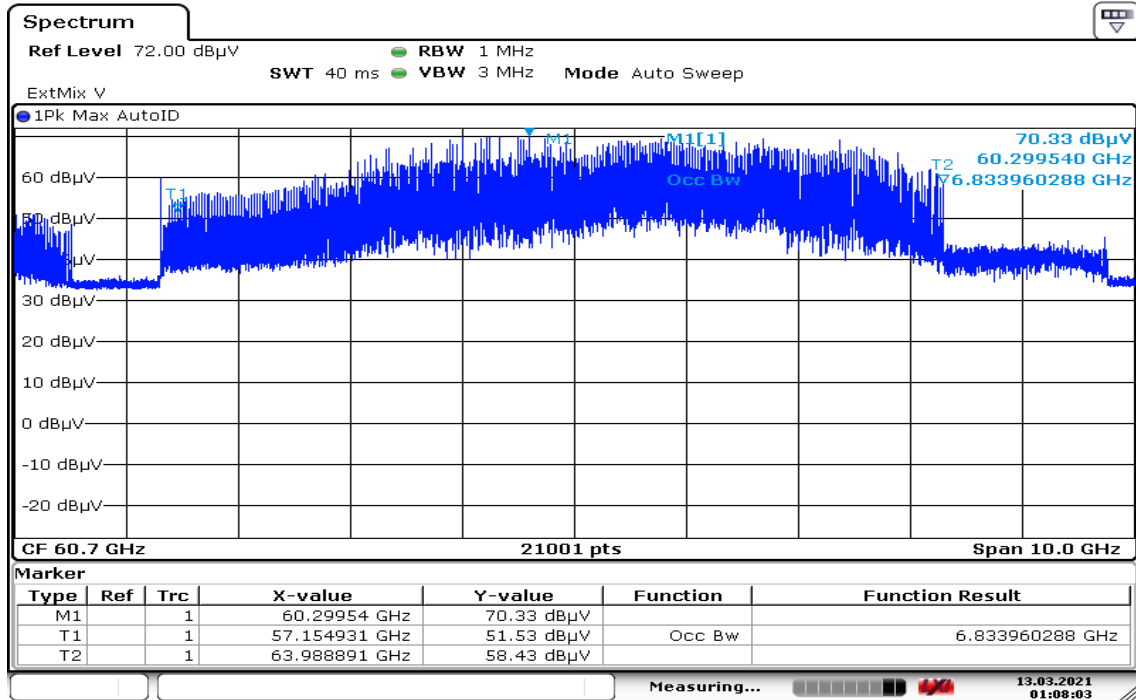
Humidity: 59% RH

Tested by: Ray Li

Operating Frequency				
Mode	FL (GHz)	FH (GHz)	Limit Range(GHz)	Test Result
Tnom Vnom (20°C 5VDC)	57.154931	63.988891	57-71	Pass
Tmax Vmax (85°C 5.75VDC)	57.000652	64.759807		Pass
Tmax Vmin (85°C 4.25VDC)	57.181596	63.992224		Pass
Tmin Vmax (0°C 5.75VDC)	57.277306	63.988415		Pass
Tmin Vmin (0°C 4.25VDC)	57.106362	64.159359		Pass

Report No.: T210224W01-RP

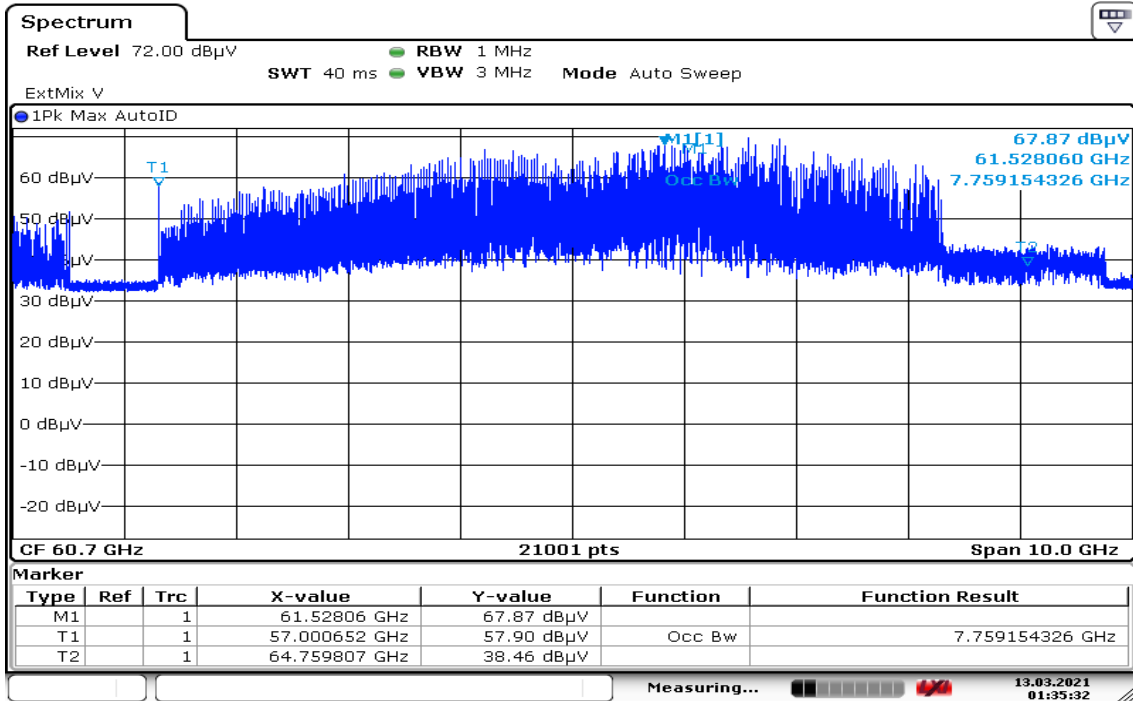
Test Plot 20°C / 5V



Date: 13.MAR.2021 01:08:03

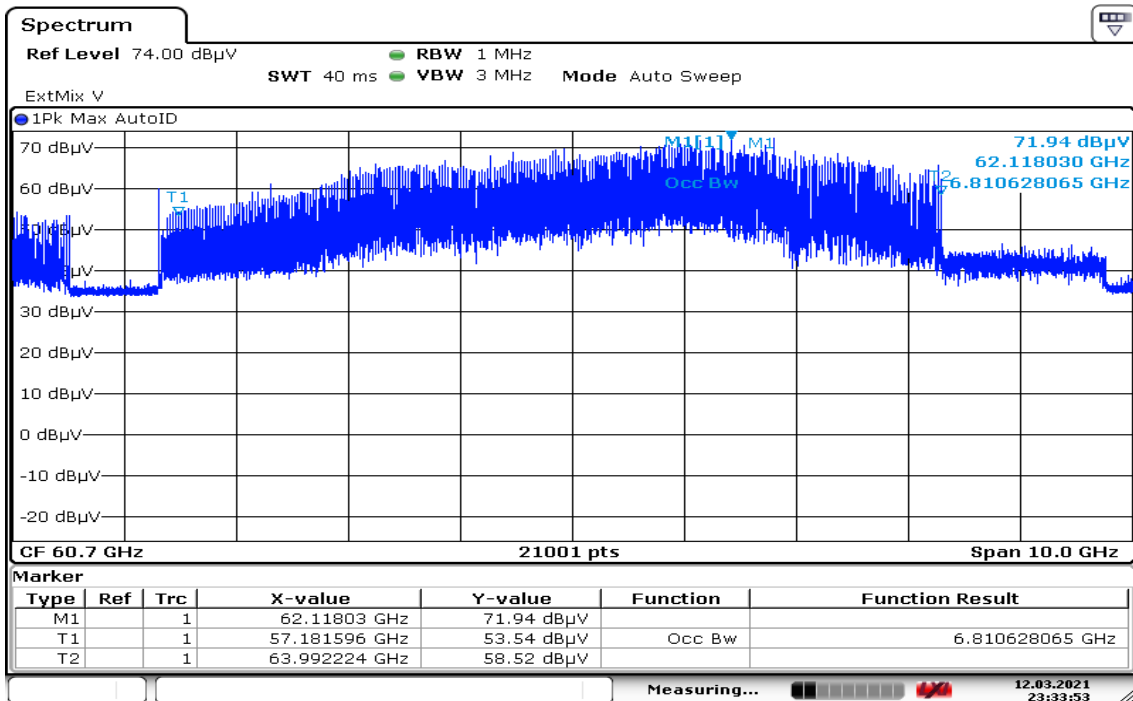
Report No.: T210224W01-RP

85°C / 5.75V



Date: 13.MAR.2021 01:35:32

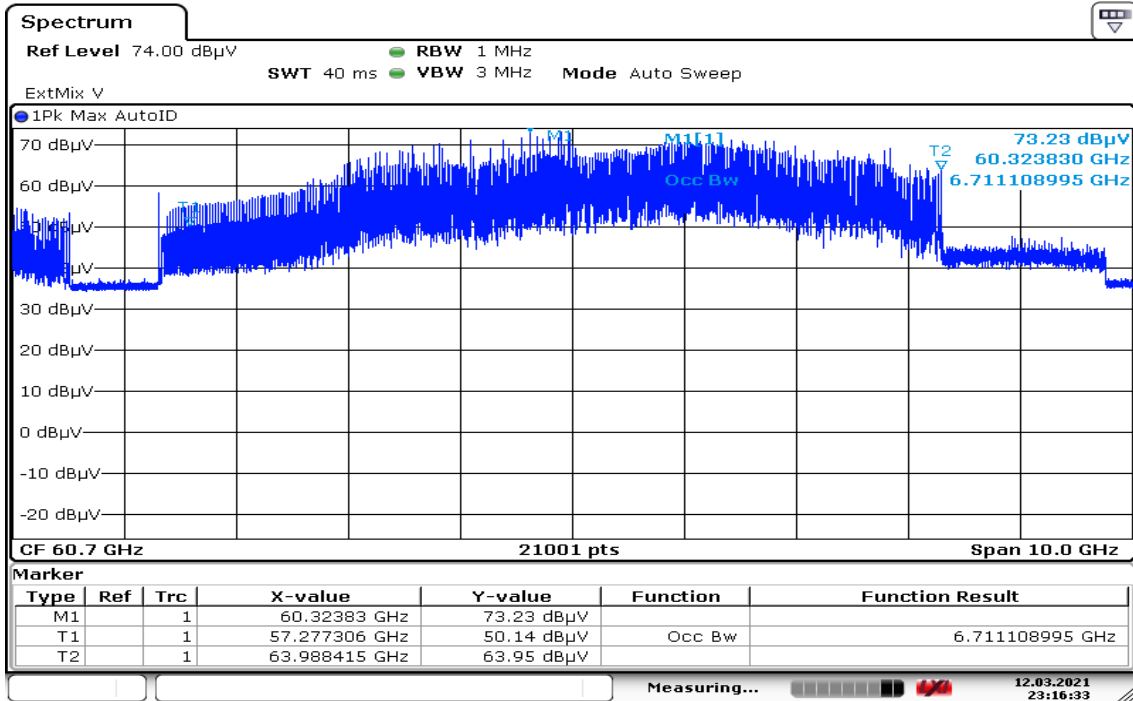
85°C / 4.25V



Date: 12.MAR.2021 23:33:53

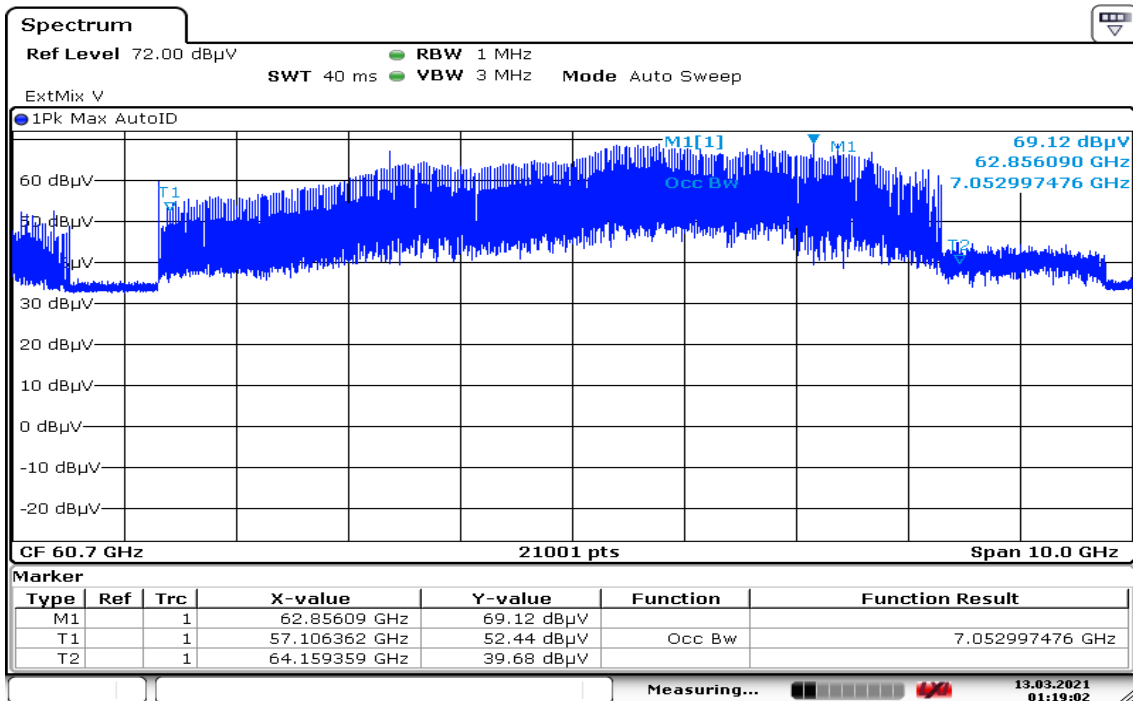
Report No.: T210224W01-RP

0°C / 5.75V



Date: 12.MAR.2021 23:16:33

0°C / 4.25V



Date: 13.MAR.2021 01:19:02

- End of Test Report -