



element

Logic PD, Inc.

SOMA3703-32-1780AKIR-A / 1027255 Rev B

FCC 15.247:2021

Bluetooth Radio

Report: LGPD0256.5, Issue Date: June 7, 2021



NVLAP LAB CODE: 200881-0



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CERTIFICATE OF TEST



Last Date of Test: April 14, 2021
Logic PD, Inc.
EUT: SOMA3703-32-1780AKIR-A / 1027255 Rev B

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2021	ANSI C63.10:2013

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required for a C2PC related to part substitution of an oscillator
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
7.5	Duty Cycle	No	N/A	Not required for a C2PC related to part substitution of an oscillator
7.8.2	Carrier Frequency Separation	No	N/A	Not required for a C2PC related to part substitution of an oscillator
7.8.3	Number of Hopping Frequencies	No	N/A	Not required for a C2PC related to part substitution of an oscillator
7.8.4	Dwell Time	No	N/A	Not required for a C2PC related to part substitution of an oscillator
7.8.5	Output Power	Yes	Pass	
7.8.5	Equivalent Isotropic Radiated Power	Yes	Pass	
7.8.6	Band Edge Compliance	No	N/A	Not required for a C2PC related to part substitution of an oscillator
7.8.6	Band Edge Compliance - Hopping Mode	No	N/A	Not required for a C2PC related to part substitution of an oscillator
7.8.7	Occupied Bandwidth	Yes	Pass	
7.8.8	Spurious Conducted Emissions	No	N/A	Not required for a C2PC related to part substitution of an oscillator

Deviations From Test Standards

None

Approved By:

Eric Brandon, Department Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY



Revision Number	Description	Date (yyyy-mm-dd)	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS



United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

United Kingdom

BEIS – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

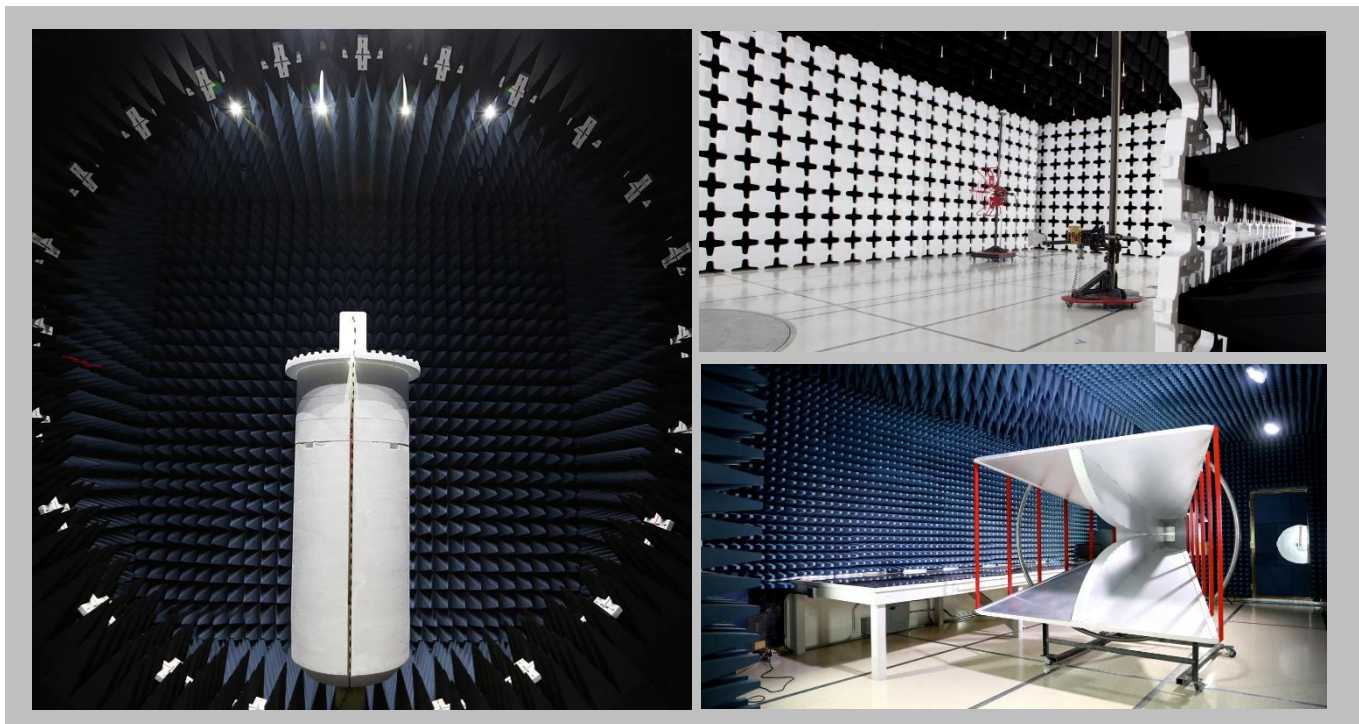
SCOPE

For details on the Scopes of our Accreditations, please visit:
<https://www.nwemc.com/emc-testing-accreditations>

FACILITIES



California Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Oregon Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP				
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157



MEASUREMENT UNCERTAINTY



Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

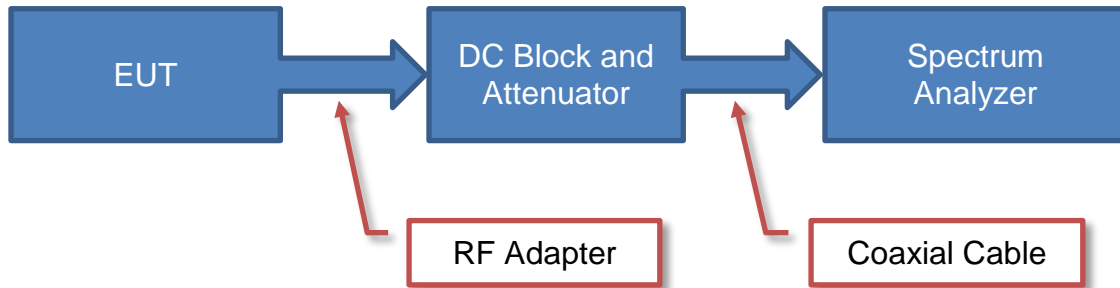
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

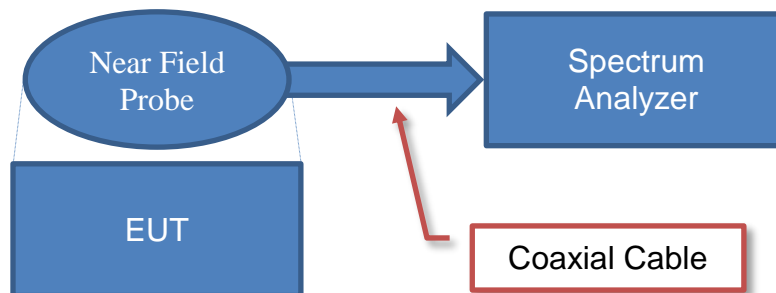
Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.6 dB	-2.6 dB

Test Setup Block Diagrams

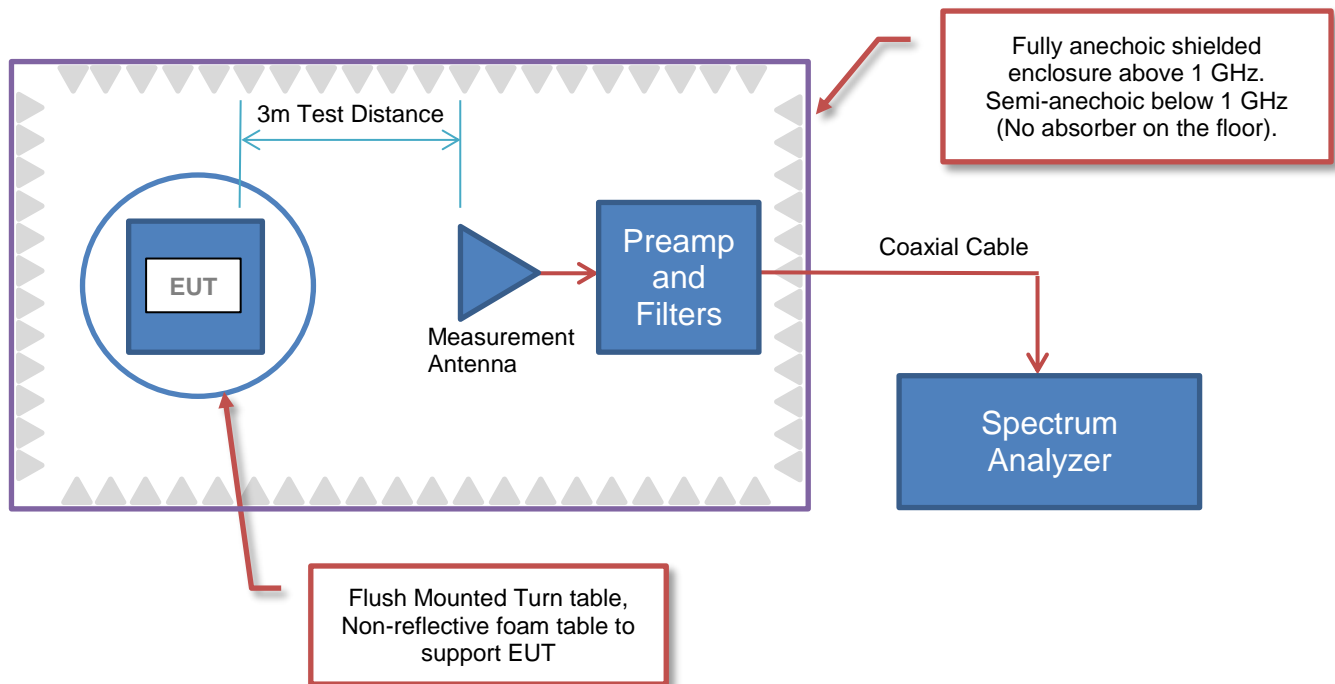
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



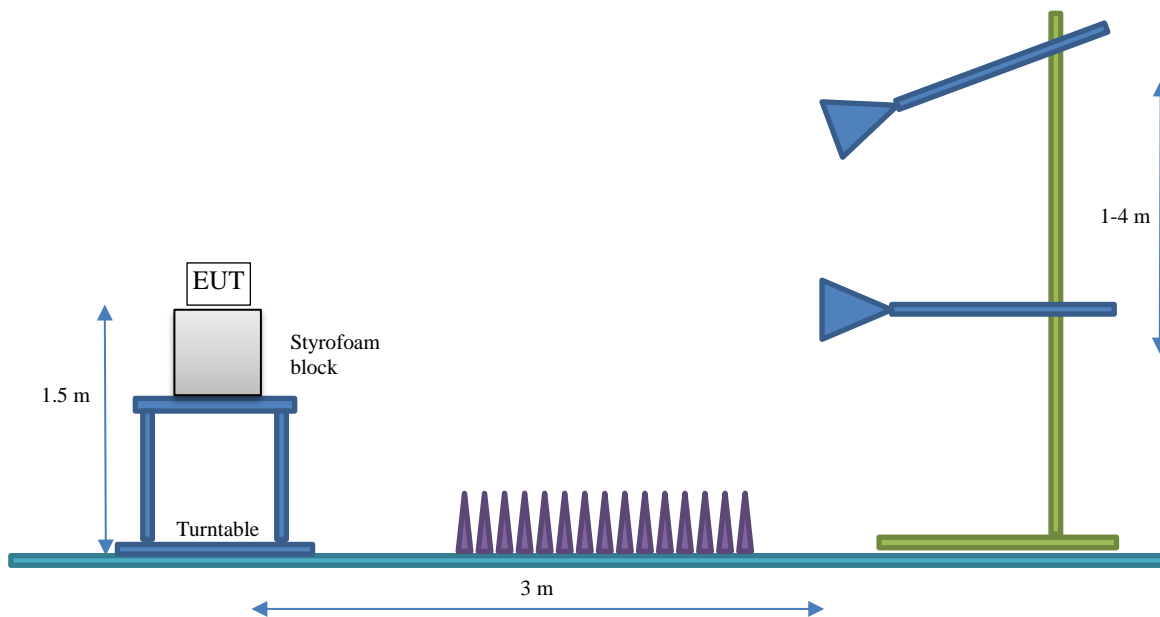
Spurious Radiated Emissions



Test Setup Block Diagrams

Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



PRODUCT DESCRIPTION



Client and Equipment Under Test (EUT) Information

Company Name:	Logic PD, Inc.
Address:	5602 105th Ave N
City, State, Zip:	Brooklyn Park, MN 55443
Test Requested By:	Nathan Kro
EUT:	SOMA3703-32-1780AKIR-A / 1027255 Rev B
First Date of Test:	March 10, 2021
Last Date of Test:	April 14, 2021
Receipt Date of Samples:	March 10, 2021
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Torpedo+WIFI SOM (System on Module) - C2PC due to EOL oscillator change
Testing Objective:
To demonstrate compliance of the Bluetooth radio to FCC 15.247 requirements.

CONFIGURATIONS



Configuration LGPD0256- 1

Software/Firmware Running during test	
Description	Version
Linux OS	3.0.101-BSP-dm37x-2.4-4
Wifi Radio Firmware	PLT 7.3.10.0.137
Bluetooth Radio Firmware	Logic_TlInit_tw32_10.6.15.bts

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
BT/2.4 GHz Wifi Antenna	Ethertronics	1000418	None
5 GHz Wifi Antenna	Ethertronics	1000418	None
Torpedo + Wireless SOM	Beason Embedded Works / Logic PD	SOMA3703-32-1780AKIR-A / 1027255 REV B	2420M00120

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
ITE Power Supply	Globtek, Inc	GT-46200-2005-T3	None

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Acer	NAV50	LUSAL0B137011586B91601
Laptop Power Supply	Delta Electronics	N17908	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
RF Cable (Ethertronics 5G Wifi Antenna)	No	0.11 m	No	5 GHz Wifi Antenna	Torpedo + Wireless SOM
RF Cable (Ethertronics BT Antenna)	No	0.05 m	No	Bluetooth Antenna	Torpedo + Wireless SOM
DC Cable (ITE power supply)	No	0.9 m	Yes	ITE Power Supply	Torpedo + Wireless SOM
AC Cable (ITE power supply)	No	1.9 m	No	ITE Power Supply	AC Mains
Serial Cable	No	>3 m	No	Torpedo + Wireless SOM	Laptop
DC Cable (Laptop power supply)	No	2.2 m	Yes	Laptop Power Supply	Laptop

CONFIGURATIONS



Configuration LGPD0256- 3

Software/Firmware Running during test	
Description	Version
Linux OS	3.0.101-BSP-dm37x-2.4-4
Wifi Radio Firmware	PLT 7.3.10.0.137
Bluetooth Radio Firmware	Logic_TlInit_tw32_10.6.15.bts

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Torpedo + Wireless SOM	Beason Embedded Works / Logic PD	SOMA3703-32-1780AKIR-A / 1027255 REV B	2420M00120

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
ITE Power Supply	Globtek, Inc	GT-46200-2005-T3	None

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Acer	NAV50	LUSAL0B137011586B91601
Laptop Power Supply	Delta Electronics	N17908	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
RF Cable (Ethertronics 5G Wifi Antenna)	No	0.11 m	No	5 GHz Wifi Antenna	Torpedo + Wireless SOM
RF Cable (Ethertronics BT Antenna)	No	0.05 m	No	Bluetooth Antenna	Torpedo + Wireless SOM
DC Cable (ITE power supply)	No	0.9 m	Yes	ITE Power Supply	Torpedo + Wireless SOM
AC Cable (ITE power supply)	No	1.9 m	No	ITE Power Supply	AC Mains
AC Cable	No		No	aptop Power Supply	AC Mains
DC Cable (Laptop power supply)	No	2.2 m	Yes	Laptop Power Supply	Laptop
Serial Cable	No	1.8 m	No	Torpedo + Wireless SOM	Laptop

CONFIGURATIONS



Configuration LGPD0256- 4

Software/Firmware Running during test	
Description	Version
Linux OS	3.0.101-BSP-dm37x-2.4-4
Wifi Radio Firmware	PLT 7.3.10.0.137
Bluetooth Radio Firmware	Logic_TlInit_tw32_10.6.15.bts

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Torpedo + Wireless SOM	Beason Embedded Works / Logic PD	SOMA3703-32-1780AKIR-A / 1027255 REV B	2420M00120
BT/2.4 GHz Wifi Antenna	Pulse Electronics	W3006	None
5GHz Wifi Antenna	Pulse Electronics	W3006	None

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
ITE Power Supply	Globtek, Inc	GT-46200-2005-T3	None

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Acer	NAV50	LUSAL0B137011586B91601
Laptop Power Supply	Delta Electronics	N17908	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Cable (ITE power supply)	No	0.9 m	Yes	ITE Power Supply	Torpedo + Wireless SOM
AC Cable (ITE power supply)	No	1.9 m	No	ITE Power Supply	AC Mains
Serial Cable	No	>3 m	No	Torpedo + Wireless SOM	Laptop
DC Cable (Laptop power supply)	No	2.2 m	Yes	Laptop Power Supply	Laptop
RF Cable (Pulse 5GHz Wifi Antenna)	No	.05 m	No	5 GHz Wifi Antenna	Torpedo + Wireless SOM
RF Cable (Pulse BT/2.4 GHz Antenna)	No	.05 m	No	Bluetooth Antenna	Torpedo + Wireless SOM

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-03-10	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2021-04-06	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2021-04-06	Equivalent Isotropic Radiated Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2021-04-14	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWER SETTINGS AND ANTENNAS



The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
WiFi Dual Band Stamp Metal Embedded Antenna, PN 1000418	Ethertronics	2400-2485	4.0 @ 2400-2485 MHz
		5150-5825	4.2 @ 5150-5825 MHz
WLAN Dualband Ceramic PN W3006	Pulse Electronics	2400-2483.5	3.2 (peak) @ 2400-2483.5 MHz
		5150-5850	4.2 (peak) @ 5150-5850 MHz

SOMA3703-32-1780AKIR-A / 1027255 REV B	Channel	Frequency (MHz)	Power Setting
Bluetooth	High Channel	2480	5 dBm

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2021.01.22.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Band Edge Testing. Transmitting Bluetooth High Ch 39 (2480 MHz) and Low Ch 1 (2402 MHz), See comments for data rate.

Transmitting Bluetooth Low Ch 1 (2402 MHz), Mid Ch 39 (2440 MHz), High Ch 79 (2480 MHz), See comments for data rate.

POWER SETTINGS INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

LGPD0256 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz
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SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	SA18E-20	TWZ	2020-09-14	2021-09-14
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	2021-03-07	2022-03-07
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	2021-01-15	2022-01-15
Cable	ESM Cable Corp.	Bilog Cables	MNH	2020-10-06	2021-10-06
Filter - High Pass	Micro-Tronics	HPM50111	LFN	2020-09-14	2021-09-14
Filter - Low Pass	Micro-Tronics	LPM50004	LFK	2020-09-24	2021-09-24
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	NCR
Antenna - Biconilog	ETS Lindgren	3142D	AXO	2019-09-03	2021-09-03
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	2021-01-15	2022-01-15
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2021-01-15	2022-01-15
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2021-01-15	2022-01-15
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	2020-10-06	2021-10-06
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNP	2020-09-11	2021-09-11
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	2020-09-11	2021-09-11
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	NCR
Antenna - Double Ridge	ETS-Lindgren	3115	AJQ	2021-01-25	2023-01-25
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	NCR
Analyzer - Spectrum Analyzer	Keysight	N9010A (EXA)	AFQ	2020-12-27	2021-12-27
Cable	Element	Biconilog Cable	MNX	2021-02-01	2022-02-01
Antenna - Biconilog	Teseq	CBL 6141B	AYD	2020-02-05	2022-02-05
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079 and SA18E-10	AOO	2021-02-01	2022-02-01

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies (in no-hop, single channel mode) and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These "pre-scans" are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector

PK = Peak Detector

AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.


Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of $10 \cdot \log(1/dc)$.

RMS measurements taken for a FHSS radio also may have a duty cycle correction subtracted using the formula $20 \cdot \log(dc)$, based on the requirements for pulsed operation from ANSI C63.10 section 7.5.



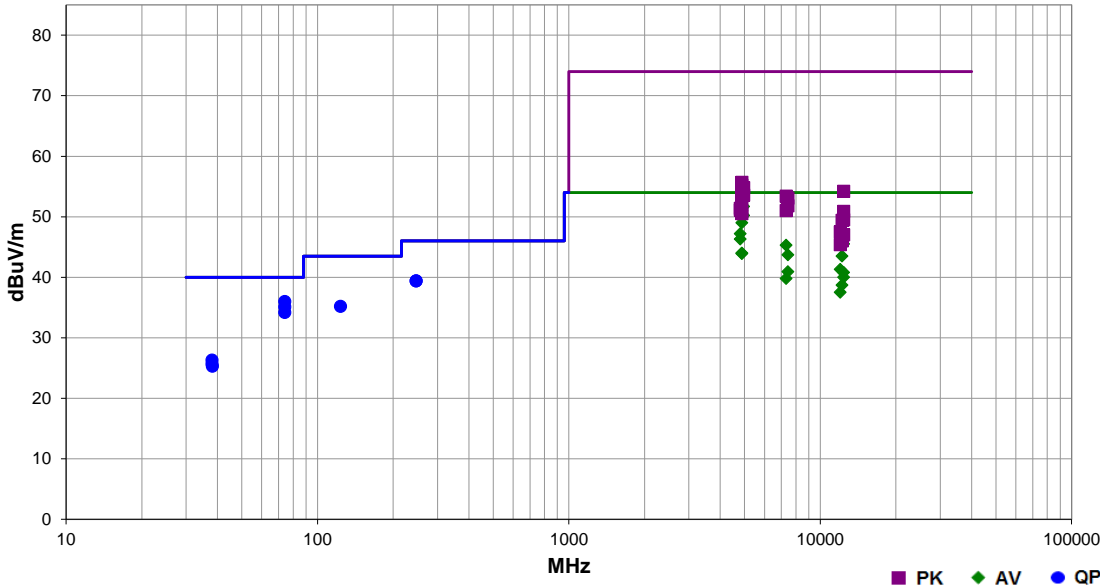
SPURIOUS RADIATED EMISSIONS

EmR5 2021.01.08.0 PSA-ESCI 2021.01.22.0

Work Order:	LGPD0256	Date:	2021-03-10	
Project:	None	Temperature:	22.6 °C	
Job Site:	MN05	Humidity:	33.7% RH	
Serial Number:	2420M00120	Barometric Pres.:	1009 mbar	
EUT:	SOMA3703-32-1780AKIR-A / 1027255 Rev B			
Configuration:	1			
Customer:	Logic PD, Inc.			
Attendees:	Eric Fritz			
EUT Power:	120VAC/60Hz			
Operating Mode:	Transmitting Bluetooth Low Ch 1 (2402 MHz), Mid Ch 39 (2440 MHz), High Ch 79 (2480 MHz), See comments for data rate.			
Deviations:	None			
Comments:	None			

Test Specifications	FCC 15.247:2021	Test Method	ANSI C63.10:2013
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Run #	24	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4880.008	50.4	2.5	3.6	69.0	0.0	0.0	Horz	AV	0.0	52.9	54.0	-1.1	EUT Horz, Mid Ch, DH5
4880.017	49.9	2.5	1.1	37.0	0.0	0.0	Horz	AV	0.0	52.4	54.0	-1.6	EUT On Side, Mid Ch, DH5
4959.992	49.1	2.6	3.3	69.0	0.0	0.0	Horz	AV	0.0	51.7	54.0	-2.3	EUT Horz, High Ch, DH5
4880.000	49.0	2.5	3.8	23.9	0.0	0.0	Vert	AV	0.0	51.5	54.0	-2.5	EUT Vert, Mid Ch, DH5
4880.025	48.5	2.5	2.6	162.0	0.0	0.0	Vert	AV	0.0	51.0	54.0	-3.0	EUT Horz, Mid Ch, DH5
4880.008	47.9	2.5	1.5	30.9	0.0	0.0	Vert	AV	0.0	50.4	54.0	-3.6	EUT On Side, Mid Ch, DH5
4959.992	47.6	2.6	1.0	26.0	0.0	0.0	Vert	AV	0.0	50.2	54.0	-3.8	EUT Vert, High Ch, DH5
74.070	46.4	-10.4	1.0	142.0	0.0	0.0	Vert	QP	0.0	36.0	40.0	-4.0	EUT Horz, High Ch, DH5
74.072	45.5	-10.4	1.0	113.0	0.0	0.0	Vert	QP	0.0	35.1	40.0	-4.9	EUT Horz, Mid Ch, DH5
4880.000	46.5	2.5	1.5	73.0	0.0	0.0	Horz	AV	0.0	49.0	54.0	-5.0	EUT Vert, Mid Ch, DH5
74.070	44.6	-10.4	1.0	120.0	0.0	0.0	Vert	QP	0.0	34.2	40.0	-5.8	EUT Horz, Low Ch, DH5
12400.550	41.6	6.0	2.0	37.0	0.0	0.0	Vert	AV	0.0	47.6	54.0	-6.4	EUT Vert, High Ch, DH5
246.866	41.8	-2.4	1.3	196.0	0.0	0.0	Horz	QP	0.0	39.4	46.0	-6.6	EUT Horz, Mid Ch, DH5
246.866	41.8	-2.4	1.2	193.9	0.0	0.0	Horz	QP	0.0	39.4	46.0	-6.6	EUT Horz, High Ch, DH5
4804.025	44.9	2.3	1.1	52.0	0.0	0.0	Horz	AV	0.0	47.2	54.0	-6.8	EUT Horz, Low Ch, DH5
4803.992	44.0	2.3	1.2	41.0	0.0	0.0	Vert	AV	0.0	46.3	54.0	-7.7	EUT Vert, Low Ch, DH5
123.439	44.9	-9.7	2.8	106.0	0.0	0.0	Horz	QP	0.0	35.2	43.5	-8.3	EUT Horz, High Ch, DH5
12399.370	44.5	1.0	1.8	55.9	0.0	0.0	Vert	AV	0.0	45.5	54.0	-8.5	EUT Vert, High Ch, DH5
7320.008	36.1	9.2	2.9	15.0	0.0	0.0	Vert	AV	0.0	45.3	54.0	-8.7	EUT Vert, Mid Ch, DH5
4880.067	41.5	2.5	1.5	45.0	0.0	0.0	Horz	AV	0.0	44.0	54.0	-10.0	EUT Horz, Mid Ch, 3DH5
4880.083	41.4	2.5	1.5	45.0	0.0	0.0	Horz	AV	0.0	43.9	54.0	-10.1	EUT Horz, Mid Ch, 2DH5
7440.092	34.5	9.2	1.5	12.9	0.0	0.0	Vert	AV	0.0	43.7	54.0	-10.3	EUT Vert, High Ch, DH5
12199.290	43.4	0.1	2.0	52.9	0.0	0.0	Vert	AV	0.0	43.5	54.0	-10.5	EUT Vert, Mid Ch, DH5
12009.380	41.4	-0.1	2.0	52.0	0.0	0.0	Vert	AV	0.0	41.3	54.0	-12.7	EUT Vert, Low Ch, DH5
7440.000	31.7	9.2	3.2	315.0	0.0	0.0	Horz	AV	0.0	40.9	54.0	-13.1	EUT Horz, High Ch, DH5

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12400.630	34.8	6.0	4.0	148.0	0.0	0.0	Horz	AV	0.0	40.8	54.0	-13.2	EUT Horz, High Ch, DH5
38.043	30.5	-4.2	1.0	357.0		0.0	Vert	QP	0.0	26.3	40.0	-13.7	EUT Horz, Low Ch, DH5
12399.310	39.0	1.0	3.6	123.0	0.0	0.0	Horz	AV	0.0	40.0	54.0	-14.0	EUT Horz, High Ch, DH5
7320.175	30.6	9.2	1.5	207.9	0.0	0.0	Horz	AV	0.0	39.8	54.0	-14.2	EUT Horz, Mid Ch, DH5
38.060	29.9	-4.2	1.0	134.0		0.0	Vert	QP	0.0	25.7	40.0	-14.3	EUT Horz, High Ch, DH5
38.186	29.6	-4.3	1.0	204.9		0.0	Vert	QP	0.0	25.3	40.0	-14.7	EUT Horz, Mid Ch, DH5
12199.300	38.6	0.1	4.0	144.0	0.0	0.0	Horz	AV	0.0	38.7	54.0	-15.3	EUT Horz, Mid Ch, DH5
12009.300	37.6	-0.1	3.5	0.0	0.0	0.0	Horz	AV	0.0	37.5	54.0	-16.5	EUT Horz, Low Ch, DH5
4879.817	53.2	2.5	3.6	69.0		0.0	Horz	PK	0.0	55.7	74.0	-18.3	EUT Horz, Mid Ch, DH5
4879.900	52.7	2.5	1.1	37.0		0.0	Horz	PK	0.0	55.2	74.0	-18.8	EUT On Side, Mid Ch, DH5
4960.275	52.2	2.6	3.3	69.0		0.0	Horz	PK	0.0	54.8	74.0	-19.2	EUT Horz, High Ch, DH5
4880.367	52.1	2.5	3.8	23.9		0.0	Vert	PK	0.0	54.6	74.0	-19.4	EUT Vert, Mid Ch, DH5
4879.750	51.8	2.5	2.6	162.0		0.0	Vert	PK	0.0	54.3	74.0	-19.7	EUT Horz, Mid Ch, DH5
12400.660	48.2	6.0	2.0	37.0		0.0	Vert	PK	0.0	54.2	74.0	-19.8	EUT Vert, High Ch, DH5
4880.483	51.2	2.5	1.5	30.9		0.0	Vert	PK	0.0	53.7	74.0	-20.3	EUT On Side, Mid Ch, DH5
4960.175	51.0	2.6	1.0	26.0		0.0	Vert	PK	0.0	53.6	74.0	-20.4	EUT Vert, High Ch, DH5
7319.325	44.2	9.2	2.9	15.0		0.0	Vert	PK	0.0	53.4	74.0	-20.6	EUT Vert, Mid Ch, DH5
7440.400	43.9	9.2	1.5	12.9		0.0	Vert	PK	0.0	53.1	74.0	-20.9	EUT Vert, High Ch, DH5
4879.742	50.4	2.5	1.5	73.0		0.0	Horz	PK	0.0	52.9	74.0	-21.1	EUT Vert, Mid Ch, DH5
7439.608	42.6	9.2	3.2	315.0		0.0	Horz	PK	0.0	51.8	74.0	-22.2	EUT Horz, High Ch, DH5
4803.667	49.1	2.3	1.1	52.0		0.0	Horz	PK	0.0	51.4	74.0	-22.6	EUT Horz, Low Ch, DH5
4803.625	48.8	2.3	1.2	41.0		0.0	Vert	PK	0.0	51.1	74.0	-22.9	EUT Vert, Low Ch, DH5
7320.717	41.8	9.2	1.5	207.9		0.0	Horz	PK	0.0	51.0	74.0	-23.0	EUT Horz, Mid Ch, DH5
12399.360	49.9	1.0	1.8	55.9		0.0	Vert	PK	0.0	50.9	74.0	-23.1	EUT Vert, High Ch, DH5
4879.958	48.4	2.5	1.5	45.0		0.0	Horz	PK	0.0	50.9	74.0	-23.1	EUT Horz, Mid Ch, 3DH5
4880.467	48.0	2.5	1.5	45.0		0.0	Horz	PK	0.0	50.5	74.0	-23.5	EUT Horz, Mid Ch, 2DH5
12400.870	43.5	6.0	4.0	148.0		0.0	Horz	PK	0.0	49.5	74.0	-24.5	EUT Horz, High Ch, DH5
12199.670	49.3	0.1	2.0	52.9		0.0	Vert	PK	0.0	49.4	74.0	-24.6	EUT Vert, Mid Ch, DH5
12009.120	47.6	-0.1	2.0	52.0		0.0	Vert	PK	0.0	47.5	74.0	-26.5	EUT Vert, Low Ch, DH5
12399.130	46.0	1.0	3.6	123.0		0.0	Horz	PK	0.0	47.0	74.0	-27.0	EUT Horz, High Ch, DH5
12200.690	45.9	0.1	4.0	144.0		0.0	Horz	PK	0.0	46.0	74.0	-28.0	EUT Horz, Mid Ch, DH5
12010.760	45.5	-0.1	3.5	0.0		0.0	Horz	PK	0.0	45.4	74.0	-28.6	EUT Horz, Low Ch, DH5

SPURIOUS RADIATED EMISSIONS



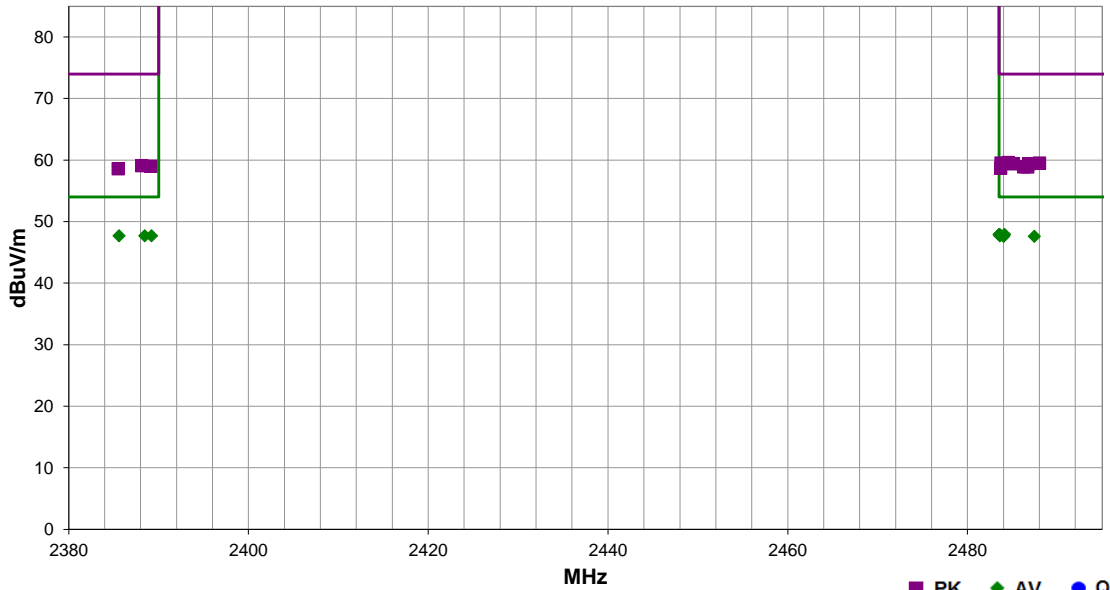
EmiRS 2021.01.08.0

PSA-ESCI 2021.01.22.0

Work Order:	LGPD0256	Date:	2021-03-10	
Project:	None	Temperature:	22.6 °C	
Job Site:	MN05	Humidity:	33.7% RH	
Serial Number:	2420M00120	Barometric Pres.:	1009 mbar	
EUT:	SOMA3703-32-1780AKIR-A / 1027255 Rev B			
Configuration:	1			
Customer:	Logic PD, Inc.			
Attendees:	Eric Fritz			
EUT Power:	120VAC/60Hz			
Operating Mode:	Band Edge Testing. Transmitting Bluetooth High Ch 39 (2480 MHz) and Low Ch 1 (2402 MHz), See comments for data rate.			
Deviations:	None			
Comments:	None			

Test Specifications	Test Method
FCC 15.247:2021	ANSI C63.10:2013

Run #	31	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2484.142	32.7	-4.8	1.5	81.0	3.0	20.0	Horz	AV	0.0	47.9	54.0	-6.1	EUT Vert, High Ch, DH5
2483.558	32.7	-4.8	1.5	81.0	3.0	20.0	Horz	AV	0.0	47.9	54.0	-6.1	EUT Vert, High Ch, 2DH5
2483.525	32.7	-4.8	1.5	81.0	3.0	20.0	Horz	AV	0.0	47.9	54.0	-6.1	EUT Vert, High Ch, 3DH5
2483.658	32.6	-4.8	1.5	138.9	3.0	20.0	Vert	AV	0.0	47.8	54.0	-6.2	EUT Vert, High Ch, DH5
2483.608	32.5	-4.8	1.99	59.0	3.0	20.0	Vert	AV	0.0	47.7	54.0	-6.3	EUT On Side, High Ch, DH5
2483.992	32.5	-4.8	1.81	84.9	3.0	20.0	Horz	AV	0.0	47.7	54.0	-6.3	EUT Horz, High Ch, DH5
2389.217	32.3	-4.6	1.5	52.9	3.0	20.0	Horz	AV	0.0	47.7	54.0	-6.3	EUT Vert, Low Ch, DH5
2388.475	32.3	-4.6	1.5	52.9	3.0	20.0	Horz	AV	0.0	47.7	54.0	-6.3	EUT Vert, Low Ch, 2DH5
2385.600	32.3	-4.6	1.5	52.9	3.0	20.0	Horz	AV	0.0	47.7	54.0	-6.3	EUT Vert, Low Ch, 3DH5
2484.042	32.4	-4.8	2.92	214.9	3.0	20.0	Horz	AV	0.0	47.6	54.0	-6.4	EUT On Side, High Ch, DH5
2487.442	32.4	-4.8	1.5	15.0	3.0	20.0	Vert	AV	0.0	47.6	54.0	-6.4	EUT Horz, High Ch, DH5
2484.525	44.4	-4.8	1.5	81.0	3.0	20.0	Horz	PK	0.0	59.6	74.0	-14.4	EUT Vert, High Ch, 2DH5
2483.725	44.3	-4.8	1.5	81.0	3.0	20.0	Horz	PK	0.0	59.5	74.0	-14.5	EUT Vert, High Ch, DH5
2488.017	44.4	-4.9	1.81	84.9	3.0	20.0	Horz	PK	0.0	59.5	74.0	-14.5	EUT Horz, High Ch, DH5
2486.825	44.2	-4.8	1.5	138.9	3.0	20.0	Vert	PK	0.0	59.4	74.0	-14.6	EUT Vert, High Ch, DH5
2485.092	44.2	-4.8	1.5	81.0	3.0	20.0	Horz	PK	0.0	59.4	74.0	-14.6	EUT Vert, High Ch, 3DH5
2388.125	43.7	-4.6	1.5	52.9	3.0	20.0	Horz	PK	0.0	59.1	74.0	-14.9	EUT Vert, Low Ch, 2DH5
2389.142	43.6	-4.6	1.5	52.9	3.0	20.0	Horz	PK	0.0	59.0	74.0	-15.0	EUT Vert, Low Ch, DH5
2486.275	43.7	-4.8	1.99	59.0	3.0	20.0	Vert	PK	0.0	58.9	74.0	-15.1	EUT On Side, High Ch, DH5
2486.700	43.7	-4.8	1.5	15.0	3.0	20.0	Vert	PK	0.0	58.9	74.0	-15.1	EUT Horz, High Ch, DH5
2483.692	43.5	-4.8	2.92	214.9	3.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	EUT On Side, High Ch, DH5
2385.500	43.2	-4.6	1.5	52.9	3.0	20.0	Horz	PK	0.0	58.6	74.0	-15.4	EUT Vert, Low Ch, 3DH5

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2021.03.17.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Transmitting Bluetooth High Ch (2480 MHz), Mid Ch (2440 MHz), Low Ch (2402 MHz), See comments for data rate.

Transmitting Bluetooth High Ch (2480 MHz), Low Ch (2402 MHz), See comments for data rate.

POWER SETTINGS INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

LGPD0256 - 4

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz
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SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Filter - Low Pass	Micro-Tronics	LPM50004	LFK	2020-09-24	2021-09-24
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2020-05-07	2021-05-07
Attenuator	Fairview Microwave	SA18E-20	TWZ	2020-09-14	2021-09-14
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	2021-03-07	2022-03-07
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	2021-01-15	2022-01-15
Cable	ESM Cable Corp.	Bilog Cables	MNH	2020-10-06	2021-10-06
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNP	2020-09-11	2021-09-11
Filter - High Pass	Micro-Tronics	HPM50111	LFN	2020-09-14	2021-09-14
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	NCR
Antenna - Biconilog	ETS Lindgren	3142D	AXO	2019-09-03	2021-09-03
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	2021-01-15	2022-01-15
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2021-01-15	2022-01-15
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2021-01-15	2022-01-15
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	2020-09-11	2021-09-11
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	2020-10-06	2021-10-06
Antenna - Double Ridge	ETS-Lindgren	3115	AJQ	2021-01-25	2023-01-25
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	NCR
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNP	2020-09-11	2021-09-11

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies (in no-hop, single channel mode) and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These "pre-scans" are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of $10 \cdot \log(1/dc)$.

RMS measurements taken for a FHSS radio also may have a duty cycle correction subtracted using the formula $20 \cdot \log(dc)$, based on the requirements for pulsed operation from ANSI C63.10 section 7.5.



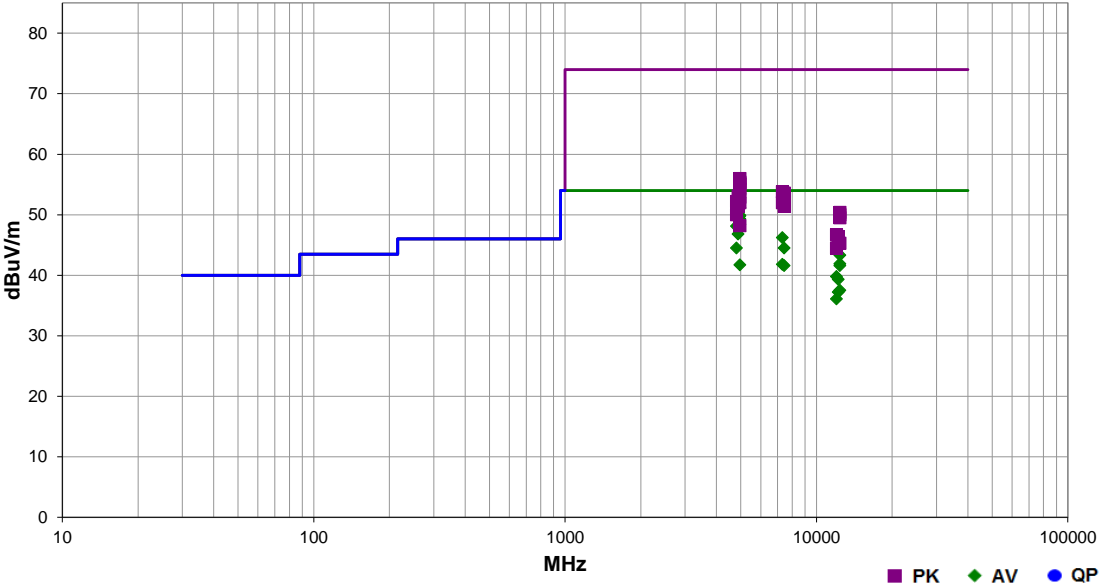
SPURIOUS RADIATED EMISSIONS

EmiR5 2021.01.08.0 PSA-ESCI 2021.03.17.0

Work Order:	LGPD0256	Date:	2021-03-25	
Project:	None	Temperature:	21.6 °C	
Job Site:	MN05	Humidity:	31.9% RH	
Serial Number:	2420M00120	Barometric Pres.:	1016 mbar	
EUT:	SOMA3703-32-1780AKIR-A / 1027255 Rev B			
Configuration:	4			
Customer:	Logic PD, Inc.			
Attendees:	Eric Fritz			
EUT Power:	120VAC/60Hz			
Operating Mode:	Transmitting Bluetooth High Ch (2480 MHz), Mid Ch (2440 MHz), Low Ch (2402 MHz), See comments for data rate.			
Deviations:	None			
Comments:	Pulse antenna. See comments for EUT orientation.			

Test Specifications	Test Method
FCC 15.247:2011	ANSI C63.10:2013

Run #	150	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dBm)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4960.050	50.9	2.6	2.1	119.0	3.0	0.0	Horz	AV	0.0	53.5	54.0	-0.5	EUT Horz, High Ch, DH5
4960.050	50.2	2.6	3.1	29.0	3.0	0.0	Horz	AV	0.0	52.8	54.0	-1.2	EUT On Side, High Ch, DH5
4960.025	48.6	2.6	1.5	120.0	3.0	0.0	Vert	AV	0.0	51.2	54.0	-2.8	EUT Vert, High Ch, DH5
4960.000	47.3	2.6	2.0	276.9	3.0	0.0	Horz	AV	0.0	49.9	54.0	-4.1	EUT Horz, High Ch, 3DH5
4960.017	47.2	2.6	2.0	276.9	3.0	0.0	Horz	AV	0.0	49.8	54.0	-4.2	EUT Horz, High Ch, 2DH5
4880.000	46.9	2.5	2.0	342.0	3.0	0.0	Horz	AV	0.0	49.4	54.0	-4.6	EUT Horz, Mid Ch, DH5
4959.975	46.7	2.6	2.4	66.0	3.0	0.0	Vert	AV	0.0	49.3	54.0	-4.7	EUT Horz, High Ch, DH5
4960.042	45.8	2.6	3.6	98.0	3.0	0.0	Vert	AV	0.0	48.4	54.0	-5.6	EUT On Side, High Ch, DH5
4804.008	45.8	2.3	2.0	297.0	3.0	0.0	Horz	AV	0.0	48.1	54.0	-5.9	EUT Horz, Low Ch, DH5
4879.992	44.3	2.5	1.5	0.0	3.0	0.0	Vert	AV	0.0	46.8	54.0	-7.2	EUT Vert, Mid Ch, DH5
7320.025	37.0	9.2	2.3	276.9	3.0	0.0	Horz	AV	0.0	46.2	54.0	-7.8	EUT Horz, Mid Ch, DH5
7440.042	35.3	9.2	1.8	33.0	3.0	0.0	Vert	AV	0.0	44.5	54.0	-9.5	EUT Vert, High Ch, DH5
4803.983	42.2	2.3	1.1	191.0	3.0	0.0	Vert	AV	0.0	44.5	54.0	-9.5	EUT Vert, Low Ch, DH5
12399.330	42.3	1.0	1.2	5.9	3.0	0.0	Vert	AV	0.0	43.3	54.0	-10.7	EUT Vert, High Ch, DH5
12400.640	35.9	6.0	1.7	346.0	3.0	0.0	Vert	AV	0.0	41.9	54.0	-12.1	EUT Vert, High Ch, DH5
7320.133	32.6	9.2	1.8	343.9	3.0	0.0	Vert	AV	0.0	41.8	54.0	-12.2	EUT Vert, Mid Ch, DH5
4959.992	39.1	2.6	1.2	202.0	3.0	0.0	Horz	AV	0.0	41.7	54.0	-12.3	EUT Vert, High Ch, DH5
7440.225	32.4	9.2	1.5	56.9	3.0	0.0	Horz	AV	0.0	41.6	54.0	-12.4	EUT Horz, High Ch, DH5
12400.610	35.6	6.0	2.4	146.9	3.0	0.0	Horz	AV	0.0	41.6	54.0	-12.4	EUT Horz, High Ch, DH5
12009.290	39.9	-0.1	1.9	274.0	3.0	0.0	Vert	AV	0.0	39.8	54.0	-14.2	EUT Vert, Low Ch, DH5
12199.270	39.2	0.1	1.5	282.9	3.0	0.0	Vert	AV	0.0	39.3	54.0	-14.7	EUT Vert, Mid Ch, DH5
12399.340	36.5	1.0	2.0	153.0	3.0	0.0	Horz	AV	0.0	37.5	54.0	-16.5	EUT Horz, High Ch, DH5
12199.330	37.1	0.1	3.9	0.0	3.0	0.0	Horz	AV	0.0	37.2	54.0	-16.8	EUT Horz, Mid Ch, DH5
12009.280	36.2	-0.1	2.2	166.0	3.0	0.0	Horz	AV	0.0	36.1	54.0	-17.9	EUT Horz, Low Ch, DH5
4959.817	53.4	2.6	2.1	119.0	3.0	0.0	Horz	PK	0.0	56.0	74.0	-18.0	EUT Horz, High Ch, DH5

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4959.850	52.8	2.6	3.1	29.0	3.0	0.0	Horz	PK	0.0	55.4	74.0	-18.6	EUT On Side, High Ch, DH5
4960.150	52.5	2.6	2.0	276.9	3.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	EUT Horz, High Ch, 2DH5
4960.325	52.5	2.6	2.0	276.9	3.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	EUT Horz, High Ch, 3DH5
4960.342	51.6	2.6	1.5	120.0	3.0	0.0	Vert	PK	0.0	54.2	74.0	-19.8	EUT Vert, High Ch, DH5
7319.783	44.6	9.2	2.3	276.9	3.0	0.0	Horz	PK	0.0	53.8	74.0	-20.2	EUT Horz, Mid Ch, DH5
7440.492	44.4	9.2	1.8	33.0	3.0	0.0	Vert	PK	0.0	53.6	74.0	-20.4	EUT Vert, High Ch, DH5
4879.767	50.6	2.5	2.0	342.0	3.0	0.0	Horz	PK	0.0	53.1	74.0	-20.9	EUT Horz, Mid Ch, DH5
4960.333	50.3	2.6	2.4	66.0	3.0	0.0	Vert	PK	0.0	52.9	74.0	-21.1	EUT Horz, High Ch, DH5
4803.867	49.9	2.3	2.0	297.0	3.0	0.0	Horz	PK	0.0	52.2	74.0	-21.8	EUT Horz, Low Ch, DH5
4960.150	49.4	2.6	3.6	98.0	3.0	0.0	Vert	PK	0.0	52.0	74.0	-22.0	EUT On Side, High Ch, DH5
7320.375	42.8	9.2	1.8	343.9	3.0	0.0	Vert	PK	0.0	52.0	74.0	-22.0	EUT Vert, Mid Ch, DH5
7440.592	42.2	9.2	1.5	56.9	3.0	0.0	Horz	PK	0.0	51.4	74.0	-22.6	EUT Horz, High Ch, DH5
4880.158	48.9	2.5	1.5	0.0	3.0	0.0	Vert	PK	0.0	51.4	74.0	-22.6	EUT Vert, Mid Ch, DH5
12400.870	44.4	6.0	2.4	146.9	3.0	0.0	Horz	PK	0.0	50.4	74.0	-23.6	EUT Horz, High Ch, DH5
12400.720	44.0	6.0	1.7	346.0	3.0	0.0	Vert	PK	0.0	50.0	74.0	-24.0	EUT Vert, High Ch, DH5
4804.133	47.7	2.3	1.1	191.0	3.0	0.0	Vert	PK	0.0	50.0	74.0	-24.0	EUT Vert, Low Ch, DH5
12399.120	48.5	1.0	1.2	5.9	3.0	0.0	Vert	PK	0.0	49.5	74.0	-24.5	EUT Vert, High Ch, DH5
4959.758	45.6	2.6	1.2	202.0	3.0	0.0	Horz	PK	0.0	48.2	74.0	-25.8	EUT Vert, High Ch, DH5
12009.200	46.8	-0.1	1.9	274.0	3.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	EUT Vert, Low Ch, DH5
12199.460	46.3	0.1	1.5	282.9	3.0	0.0	Vert	PK	0.0	46.4	74.0	-27.6	EUT Vert, Mid Ch, DH5
12399.110	44.3	1.0	2.0	153.0	3.0	0.0	Horz	PK	0.0	45.3	74.0	-28.7	EUT Horz, High Ch, DH5
12199.450	45.2	0.1	3.9	0.0	3.0	0.0	Horz	PK	0.0	45.3	74.0	-28.7	EUT Horz, Mid Ch, DH5
12010.740	44.6	-0.1	2.2	166.0	3.0	0.0	Horz	PK	0.0	44.5	74.0	-29.5	EUT Horz, Low Ch, DH5



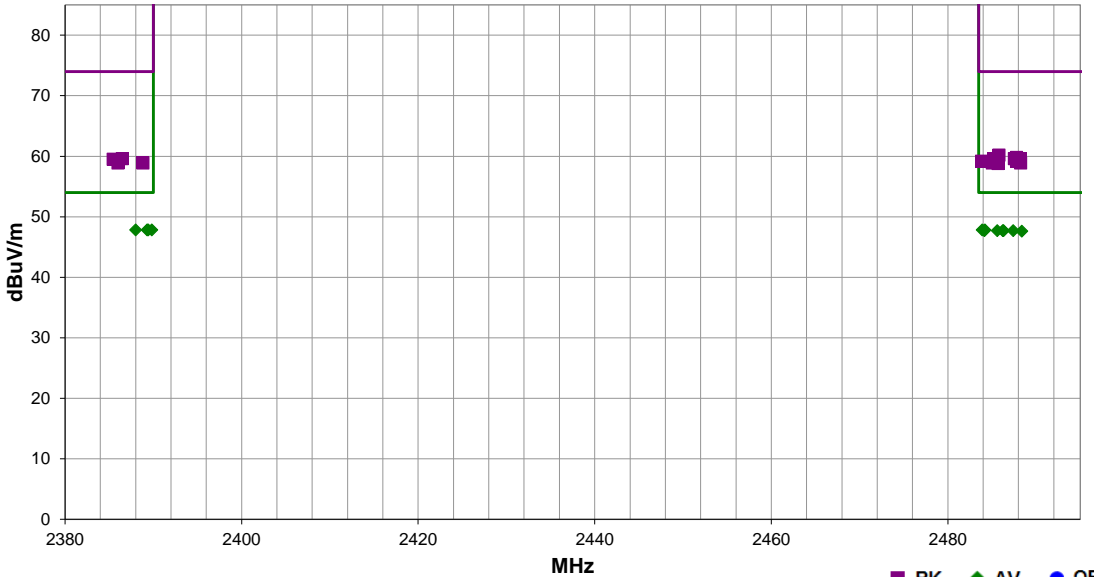
SPURIOUS RADIATED EMISSIONS

EmR5 2021.01.08.0 PSA-ESCI 2021.03.17.0

Work Order:	LGPD0256	Date:	2021-03-25	
Project:	None	Temperature:	21.6 °C	
Job Site:	MN05	Humidity:	31.9% RH	
Serial Number:	2420M00120	Barometric Pres.:	1016 mbar	
EUT:	SOMA3703-32-1780AKIR-A / 1027255 Rev B			
Configuration:	4			
Customer:	Logic PD, Inc.			
Attendees:	Eric Fritz			
EUT Power:	120VAC/60Hz			
Operating Mode:	Transmitting Bluetooth High Ch (2480 MHz), Low Ch (2402 MHz), See comments for data rate.			
Deviations:	None			
Comments:	Pulse antenna. Band Edge.			

Test Specifications	FCC 15.247:2021	Test Method	ANSI C63.10:2013
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Run #	156	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2484.217	32.6	-4.8	1.5	19.9	3.0	20.0	Horz	AV	0.0	47.8	54.0	-6.2	EUT On Side, High Ch, 2DH5
2483.908	32.6	-4.8	1.5	19.9	3.0	20.0	Horz	AV	0.0	47.8	54.0	-6.2	EUT On Side, High Ch, 3DH5
2389.417	32.4	-4.6	1.5	141.0	3.0	20.0	Horz	AV	0.0	47.8	54.0	-6.2	EUT On Side, Low Ch, DH5
2389.825	32.4	-4.6	2.53	5.9	3.0	20.0	Vert	AV	0.0	47.8	54.0	-6.2	EUT On Side, Low Ch, DH5
2389.300	32.4	-4.6	1.5	141.0	3.0	20.0	Horz	AV	0.0	47.8	54.0	-6.2	EUT On Side, Low Ch, 2DH5
2388.008	32.4	-4.6	1.5	141.0	3.0	20.0	Horz	AV	0.0	47.8	54.0	-6.2	EUT On Side, Low Ch, 3DH5
2485.617	32.5	-4.8	2.7	84.0	3.0	20.0	Horz	AV	0.0	47.7	54.0	-6.3	EUT Horz, High Ch, 3DH5
2487.425	32.5	-4.8	1.5	69.0	3.0	20.0	Vert	AV	0.0	47.7	54.0	-6.3	EUT Horz, High Ch, 3DH5
2486.242	32.5	-4.8	1.5	19.0	3.0	20.0	Horz	AV	0.0	47.7	54.0	-6.3	EUT On Side, High Ch, DH5
2486.317	32.5	-4.8	1.5	182.9	3.0	20.0	Horz	AV	0.0	47.7	54.0	-6.3	EUT Vert, High Ch, DH5
2484.158	32.5	-4.8	1.71	178.0	3.0	20.0	Vert	AV	0.0	47.7	54.0	-6.3	EUT On Side, High Ch, DH5
2488.383	32.5	-4.9	1.5	225.9	3.0	20.0	Vert	AV	0.0	47.6	54.0	-6.4	EUT On Side, High Ch, DH5
2485.783	45.0	-4.8	1.5	19.9	3.0	20.0	Horz	PK	0.0	60.2	74.0	-13.8	EUT On Side, High Ch, 3DH5
2487.775	44.6	-4.8	1.5	19.9	3.0	20.0	Horz	PK	0.0	59.8	74.0	-14.2	EUT On Side, High Ch, 2DH5
2485.175	44.4	-4.8	1.5	256.0	3.0	20.0	Horz	PK	0.0	59.6	74.0	-14.4	EUT Horz, High Ch, 3DH5
2487.542	44.4	-4.8	3.61	239.9	3.0	20.0	Vert	PK	0.0	59.6	74.0	-14.4	EUT Horz, High Ch, 3DH5
2488.208	44.5	-4.9	2.7	84.0	3.0	20.0	Horz	PK	0.0	59.6	74.0	-14.4	EUT Horz, High Ch, 3DH5
2386.483	44.2	-4.6	1.5	141.0	3.0	20.0	Horz	PK	0.0	59.6	74.0	-14.4	EUT On Side, High Ch, 3DH5
2385.450	44.1	-4.6	1.5	141.0	3.0	20.0	Horz	PK	0.0	59.5	74.0	-14.5	EUT On Side, Low Ch, 2DH5
2483.825	44.0	-4.8	1.5	69.0	3.0	20.0	Vert	PK	0.0	59.2	74.0	-14.8	EUT Horz, High Ch, 3DH5
2487.792	44.0	-4.8	1.5	182.9	3.0	20.0	Horz	PK	0.0	59.2	74.0	-14.8	EUT Vert, High Ch, DH5
2485.033	43.7	-4.8	1.5	19.0	3.0	20.0	Horz	PK	0.0	58.9	74.0	-15.1	EUT On Side, High Ch, DH5
2488.242	43.8	-4.9	1.5	225.9	3.0	20.0	Vert	PK	0.0	58.9	74.0	-15.1	EUT On Side, High Ch, DH5
2388.817	43.5	-4.6	1.5	141.0	3.0	20.0	Horz	PK	0.0	58.9	74.0	-15.1	EUT On Side, Low Ch, DH5
2385.983	43.5	-4.6	2.53	5.9	3.0	20.0	Vert	PK	0.0	58.9	74.0	-15.1	EUT On Side, Low Ch, DH5

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2485.700	43.6	-4.8	1.71	178.0	3.0	20.0	Vert	PK	0.0	58.8	74.0	-15.2	EUT Vert, High Ch, DH5



OUTPUT POWER (High Channel)

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5171B (EXG)	TEY	2019-12-31	2022-12-31
Block - DC	Fairview Microwave	SD3379	AMZ	2020-11-04	2021-11-04
Attenuator	Fairview Microwave	18B5W-26	RFY	2020-06-03	2021-06-03
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2020-09-14	2021-09-14
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2020-05-07	2021-05-07

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

The method found in ANSI C63.10:2013 Section 7.8.5 was used for a FHSS radio.

OUTPUT POWER (High Channel)



TelTx 2019.08.30.0 XMIT 2020.12.30.0

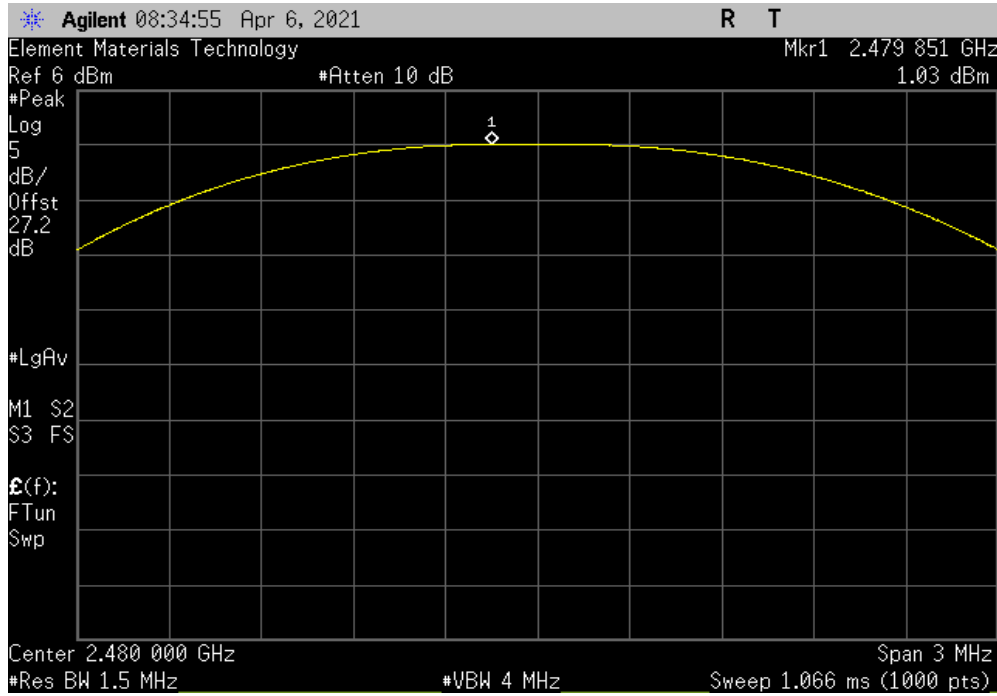
EUT: SOMA3703-32-1780AKIR-A / 1027255 Rev B		Work Order: LGPD0256	
Serial Number: 2420M00120		Date: 6-Apr-21	
Customer: Logic PD, Inc.		Temperature: 21.3 °C	
Attendees: Eric Fritz		Humidity: 40.6% RH	
Project: None		Barometric Pres.: 1009 mbar	
Tested by: Andrew Rogstad		Power: 120VAC/60Hz	Job Site: MN08
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		ANSI C63.10:2013	
COMMENTS			
Reference level offset includes measurement cable, attenuator, and DC block.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	3	Signature <i>Andrew Rogstad</i>	
		Out Pwr (dBm)	Limit (dBm) Result
DH5, GFSK	High Channel (2480 MHz)	1.033	21 Pass
2DH5, pi/4-DQPSK	High Channel (2480 MHz)	-1.19	21 Pass
3DH5, 8-DPSK	High Channel (2480 MHz)	-0.599	21 Pass

OUTPUT POWER (High Channel)

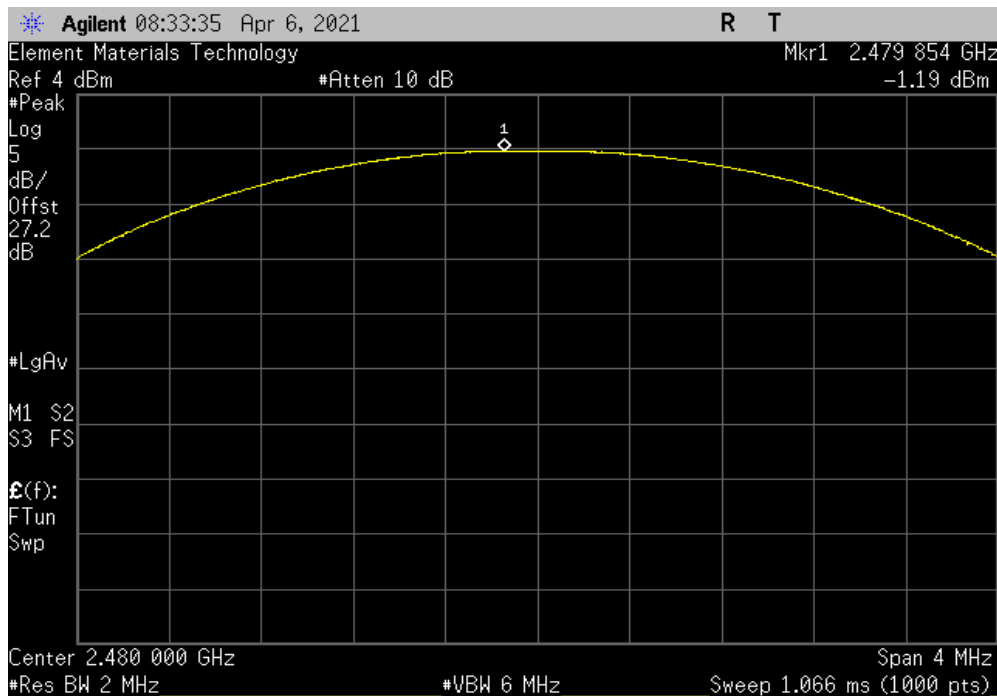


TuTx 2019.08.30.0 XMI 2020.12.30.0

DH5, GFSK, High Channel (2480 MHz)				Out Pwr (dBm)	Limit (dBm)	Result
				1.033	21	Pass



2DH5, pi/4-DQPSK, High Channel (2480 MHz)				Out Pwr (dBm)	Limit (dBm)	Result
				-1.19	21	Pass

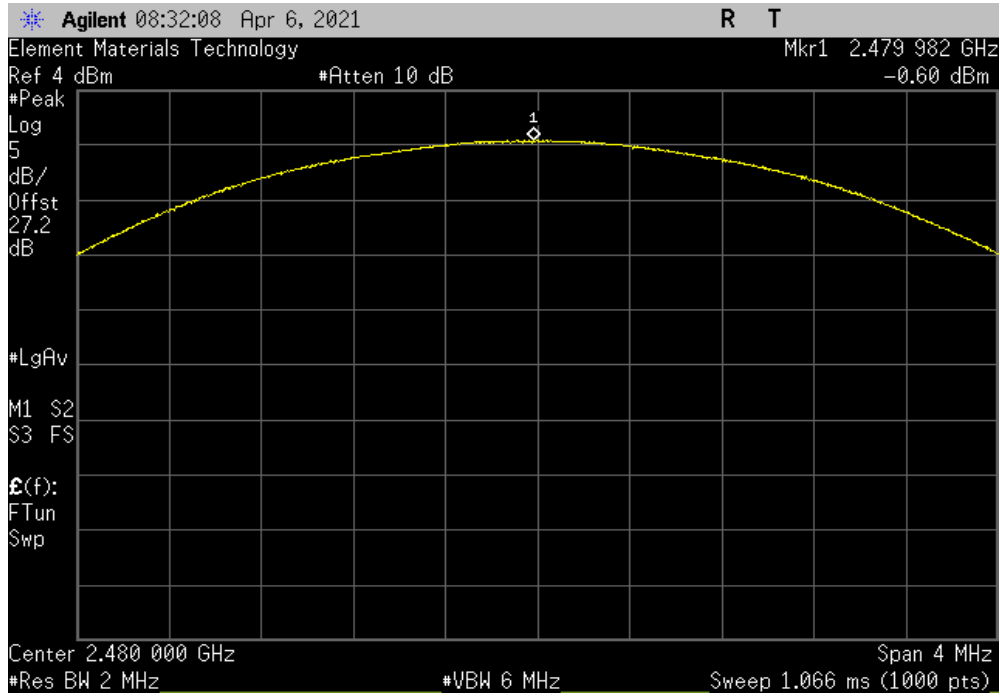


OUTPUT POWER (High Channel)



TbTx 2019.08.30.0 XMI 2020.12.30.0

3DH5, 8-DPSK, High Channel (2480 MHz)						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.599	21	Pass



OUTPUT POWER (Low AND Mid Channel)



XMH 2020.12.30.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	E4422B	TGQ	2021-03-24	2024-03-24
Block - DC	Fairview Microwave	SD3379	AMZ	2020-11-04	2021-11-04
Attenuator	S.M. Electronics	SA26B-20	RFW	2021-02-05	2022-02-05
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2020-09-14	2021-09-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	2020-07-14	2021-07-14

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

The method found in ANSI C63.10:2013 Section 7.8.5 was used for a FHSS radio.

OUTPUT POWER (Low AND Mid Channel)



TstTx 2019.08.30.0 XMI 2020.12.30.0

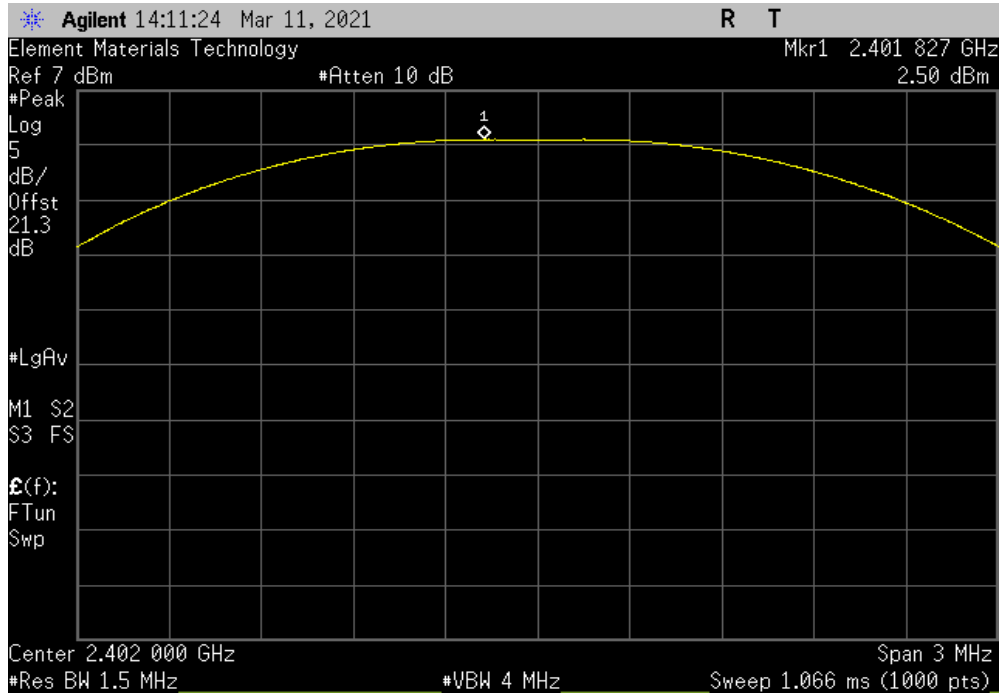
EUT: SOMA3703-32-1780AKIR-A / 1027255 Rev B		Work Order: LGPD0256
Serial Number: 2420M00120		Date: 11-Mar-21
Customer: Logic PD, Inc.		Temperature: 23.1 °C
Attendees: Eric Fritz		Humidity: 30.2% RH
Project: None		Barometric Pres.: 1021 mbar
Tested by: Andrew Rogstad	Power: 120VAC/60Hz	Job Site: MN08
TEST SPECIFICATIONS		
FCC 15.247:2021		Test Method: ANSI C63.10:2013
COMMENTS		
Reference level includes measurement cable, attenuator, and DC block.		
DEVIATIONS FROM TEST STANDARD		
None		
Configuration #	3	Signature <i>Andrew Rogstad</i>
		Out Pwr (dBm) Limit (dBm) Result
DH5, GFSK		
	Low Channel (2402 MHz)	2.5 21 Pass
	Mid Channel (2440 MHz)	2.433 21 Pass
2DH5, pi/4-DQPSK		
	Low Channel (2402 MHz)	-0.756 21 Pass
	Mid Channel (2440 MHz)	-0.795 21 Pass
3DH5, 8-DPSK		
	Low Channel (2402 MHz)	-0.142 21 Pass
	Mid Channel (2440 MHz)	-0.199 21 Pass

OUTPUT POWER (Low AND Mid Channel)

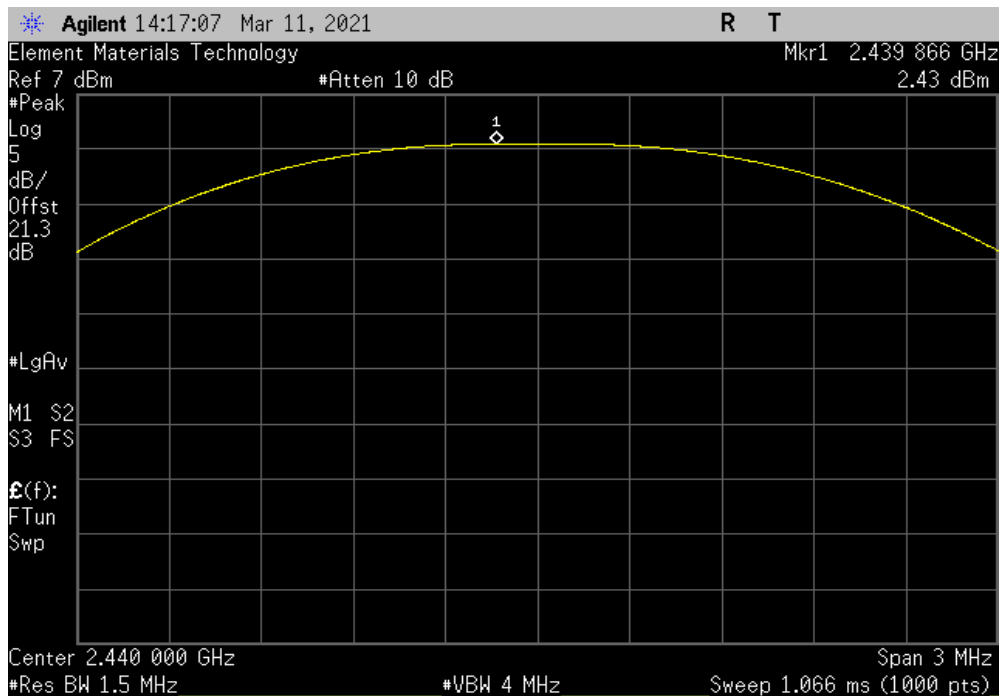


TbTx 2019.08.30.0 XMt 2020.12.30.0

DH5, GFSK, Low Channel (2402 MHz)						
				Out Pwr (dBm)	Limit (dBm)	Result
				2.5	21	Pass



DH5, GFSK, Mid Channel (2440 MHz)						
				Out Pwr (dBm)	Limit (dBm)	Result
				2.433	21	Pass

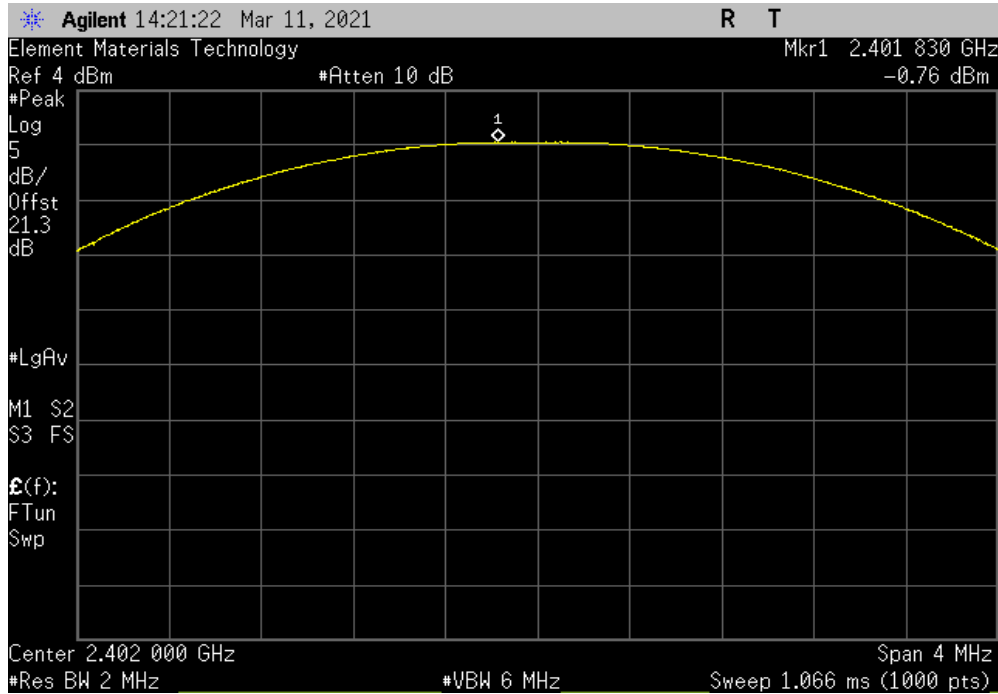


OUTPUT POWER (Low AND Mid Channel)

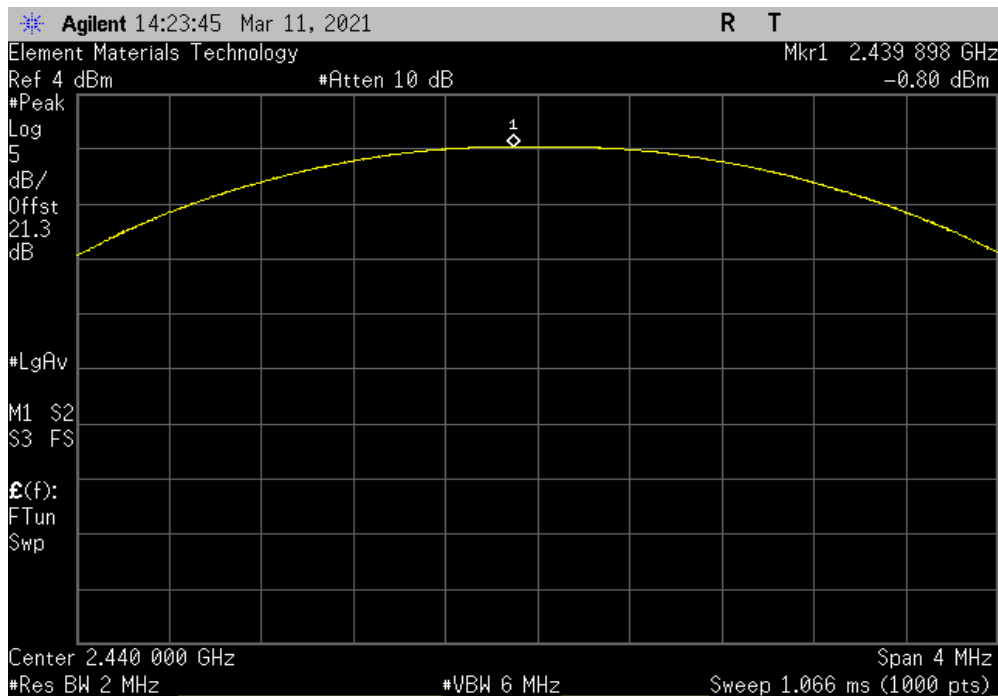


TuTx 2019.08.30.0 XMI 2020.12.30.0

2DH5, pi/4-DQPSK, Low Channel (2402 MHz)						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.756	21	Pass



2DH5, pi/4-DQPSK, Mid Channel (2440 MHz)						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.795	21	Pass

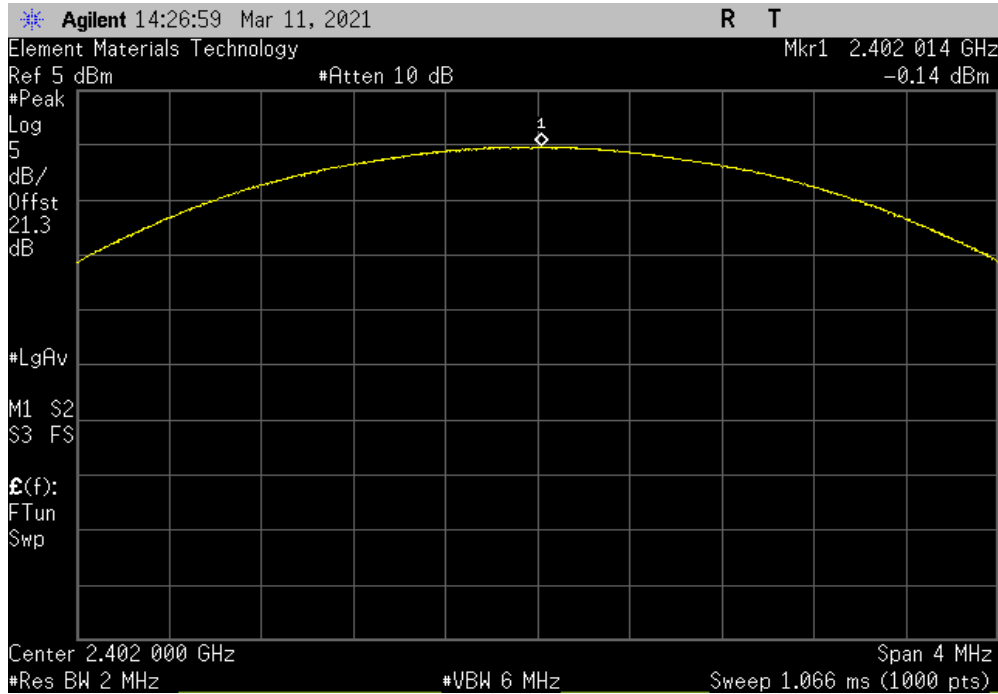


OUTPUT POWER (Low AND Mid Channel)

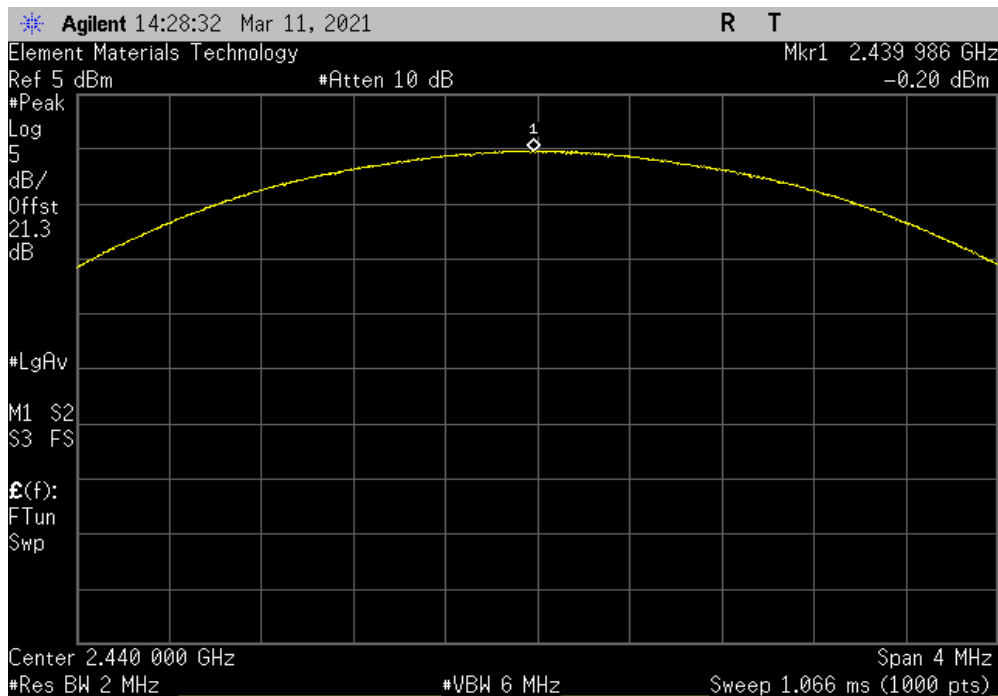


TbTx 2019.08.30.0 XMI 2020.12.30.0

3DH5, 8-DPSK, Low Channel (2402 MHz)						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.142	21	Pass



3DH5, 8-DPSK, Mid Channel (2440 MHz)						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.199	21	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP) (High Channel)



XMit 2020.12.30.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5171B (EXG)	TEY	2019-12-31	2022-12-31
Block - DC	Fairview Microwave	SD3379	AMZ	2020-11-04	2021-11-04
Attenuator	Fairview Microwave	18B5W-26	RFY	2020-06-03	2021-06-03
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2020-09-14	2021-09-14
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2020-05-07	2021-05-07

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

The method found in ANSI C63.10:2013 Section 7.8.5 was used for a FHSS radio.

Equivalent Isotropic Radiated Power (EIRP) = Max Measured Power + Antenna gain (dBi)

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP) (High Channel)



TelTx 2019.08.30.0 XMI 2020.12.30.0

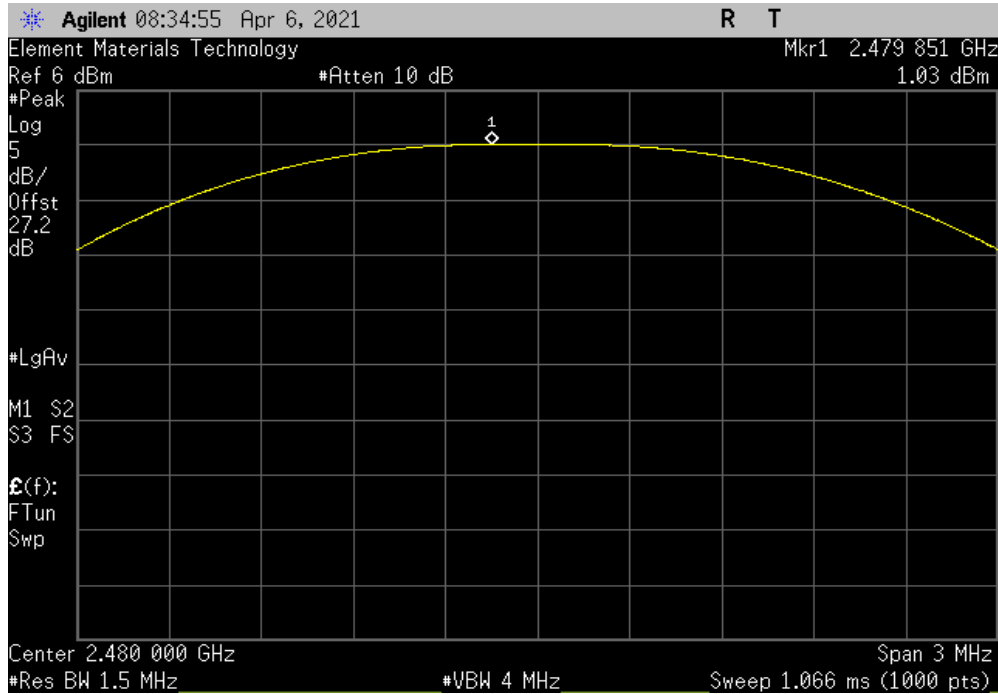
EUT: SOMA3703-32-1780AKIR-A / 1027255 Rev B		Work Order: LGPD0256				
Serial Number: 2420M00120		Date: 6-Apr-21				
Customer: Logic PD, Inc.		Temperature: 21.5 °C				
Attendees: Eric Fritz		Humidity: 40.5% RH				
Project: None		Barometric Pres.: 1009 mbar				
Tested by: Andrew Rogstad		Power: 120VAC/60Hz				
		Job Site: MN08				
TEST SPECIFICATIONS						
FCC 15.247:2021		Test Method				
		ANSI C63.10:2013				
COMMENTS						
Reference level offset includes measurement cable, attenuator, and DC block. EIRP calculated with highest gain antenna.						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	3	Signature <i>Andrew Rogstad</i>				
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
DH5, GFSK	High Channel (2480 MHz)	1.033	4	5.033	27	Pass
2DH5, pi/4-DQPSK	High Channel (2480 MHz)	-1.19	4	2.81	27	Pass
3DH5, 8-DPSK	High Channel (2480 MHz)	-0.599	4	3.401	27	Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP) (High Channel)

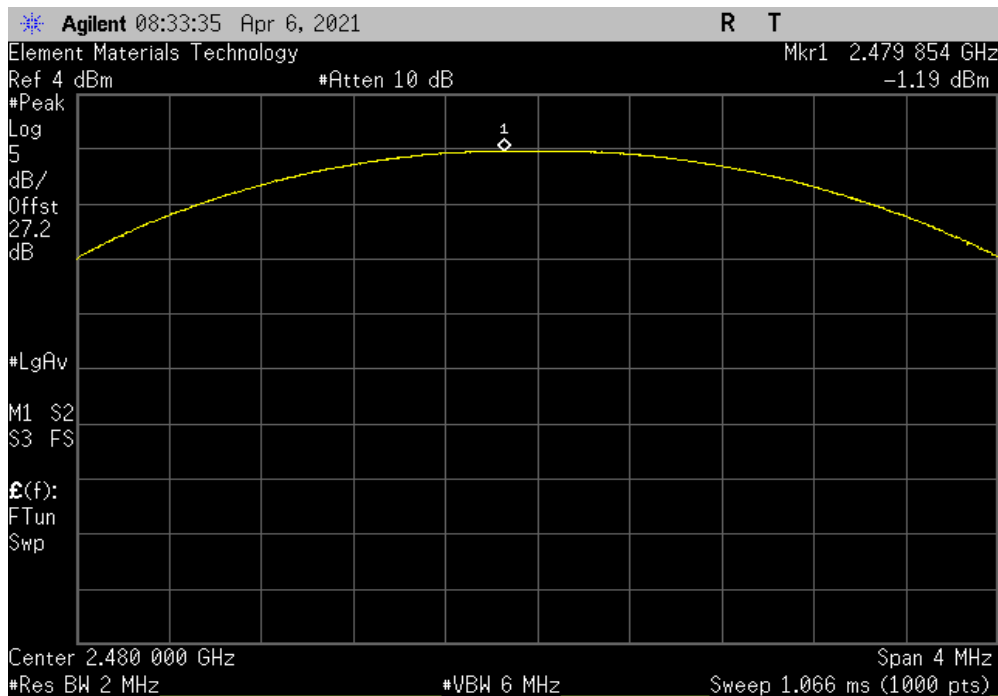


TuTx 2019.08.30.0 XMI 2020.12.30.0

DH5, GFSK, High Channel (2480 MHz)						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	1.033	4	5.033	27	Pass	



2DH5, pi/4-DQPSK, High Channel (2480 MHz)						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	-1.19	4	2.81	27	Pass	

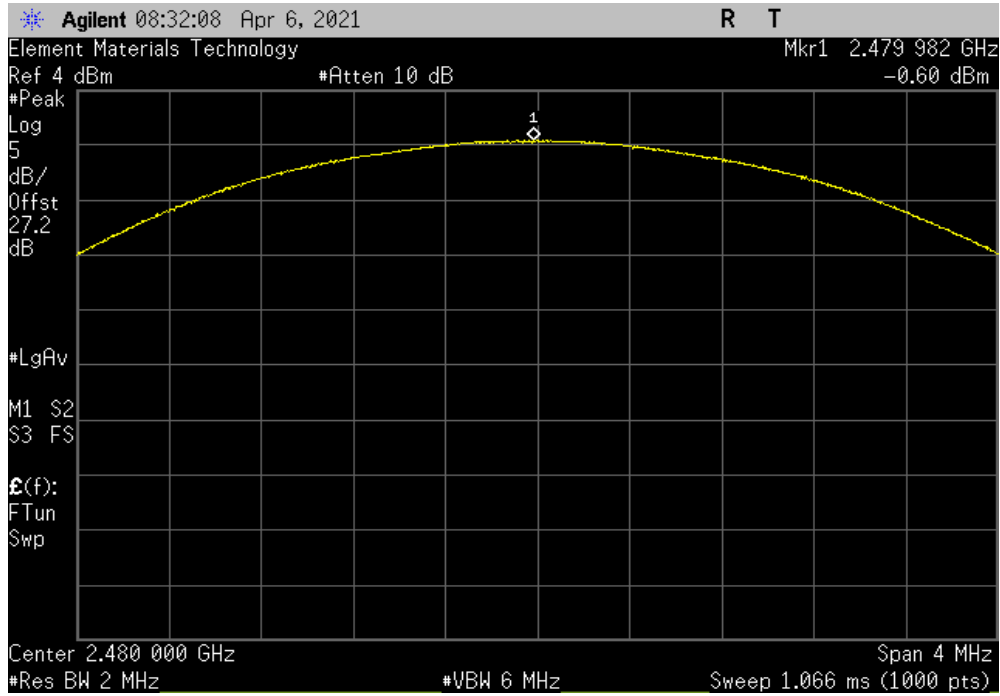


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP) (High Channel)



TbTx 2019.08.30.0 XMI 2020.12.30.0

3DH5, 8-DPSK, High Channel (2480 MHz)						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-0.599	4	3.401	27	Pass		



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP) (Low AND Mid Channel)



element

XMIT 2020.12.30.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	E4422B	TGQ	2021-03-24	2024-03-24
Block - DC	Fairview Microwave	SD3379	AMZ	2020-11-04	2021-11-04
Attenuator	S.M. Electronics	SA26B-20	RFW	2021-02-05	2022-02-05
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2020-09-14	2021-09-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	2020-07-14	2021-07-14

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

The method found in ANSI C63.10:2013 Section 7.8.5 was used for a FHSS radio.

Equivalent Isotropic Radiated Power (EIRP) = Max Measured Power + Antenna gain (dBi)

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP) (Low AND Mid Channel)



Tel: 2019.08.30.0 XM: 2020.12.30.0

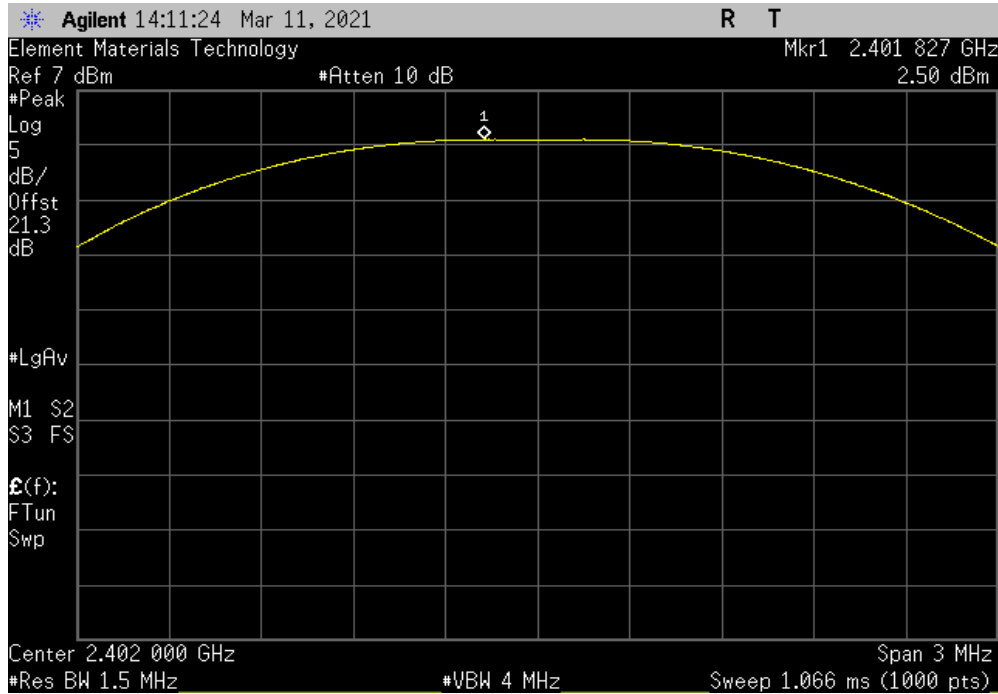
EUT: SOMA3703-32-1780AKIR-A / 1027255 Rev B		Work Order: LGPD0256				
Serial Number: 2420M00120		Date: 11-Mar-21				
Customer: Logic PD, Inc.		Temperature: 23.1 °C				
Attendees: Eric Fritz		Humidity: 30.2% RH				
Project: None		Barometric Pres.: 1021 mbar				
Tested by: Andrew Rogstad		Power: 120VAC/60Hz				
		Job Site: MN08				
TEST SPECIFICATIONS		Test Method				
FCC 15.247:2021		ANSI C63.10:2013				
COMMENTS						
Reference level includes measurement cable, attenuator, and DC block. EIRP calculated with highest gain antenna.						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	3	Signature <i>Andrew Rogstad</i>				
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
DH5, GFSK						
	Low Channel (2402 MHz)	2.5	4	6.5	27	Pass
	Mid Channel (2440 MHz)	2.433	4	6.433	27	Pass
2DH5, pi/4-DQPSK						
	Low Channel (2402 MHz)	-0.756	4	3.244	27	Pass
	Mid Channel (2440 MHz)	-0.795	4	3.205	27	Pass
3DH5, 8-DPSK						
	Low Channel (2402 MHz)	-0.142	4	3.858	27	Pass
	Mid Channel (2440 MHz)	-0.199	4	3.801	27	Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP) (Low AND Mid Channel)

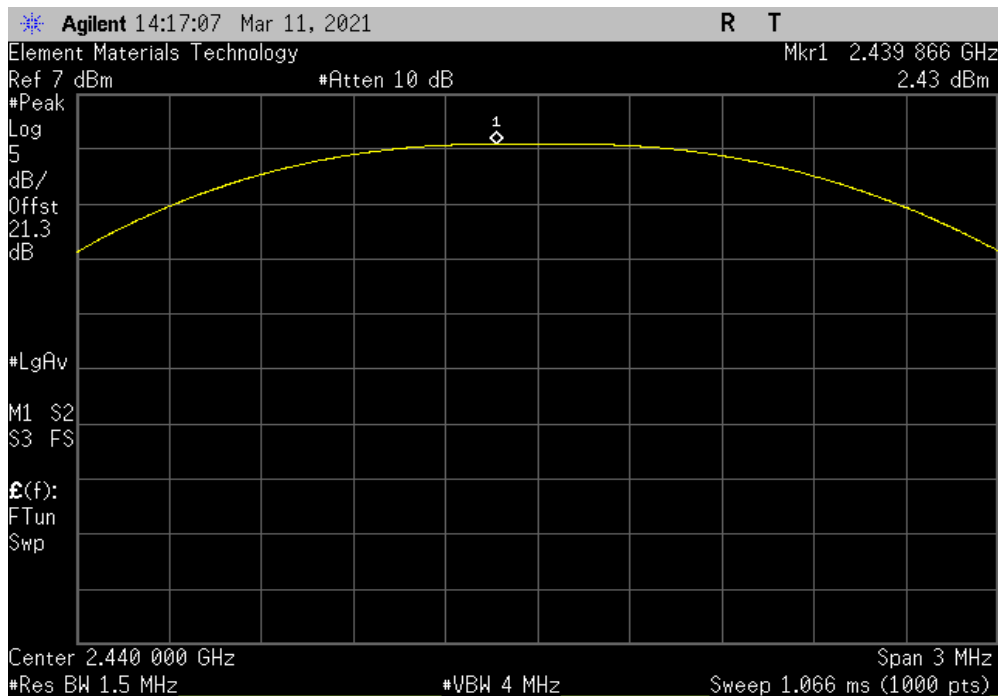


TuTx 2019.08.30.0 XMI 2020.12.30.0

DH5, GFSK, Low Channel (2402 MHz)						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	2.5	4	6.5	27	Pass	



DH5, GFSK, Mid Channel (2440 MHz)						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	2.433	4	6.433	27	Pass	

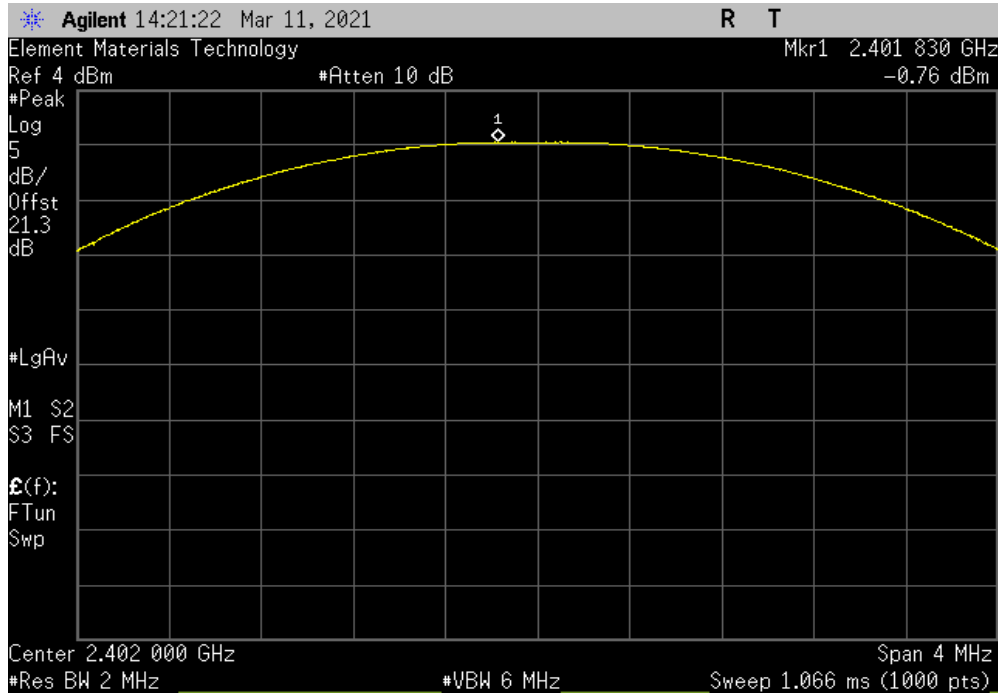


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP) (Low AND Mid Channel)

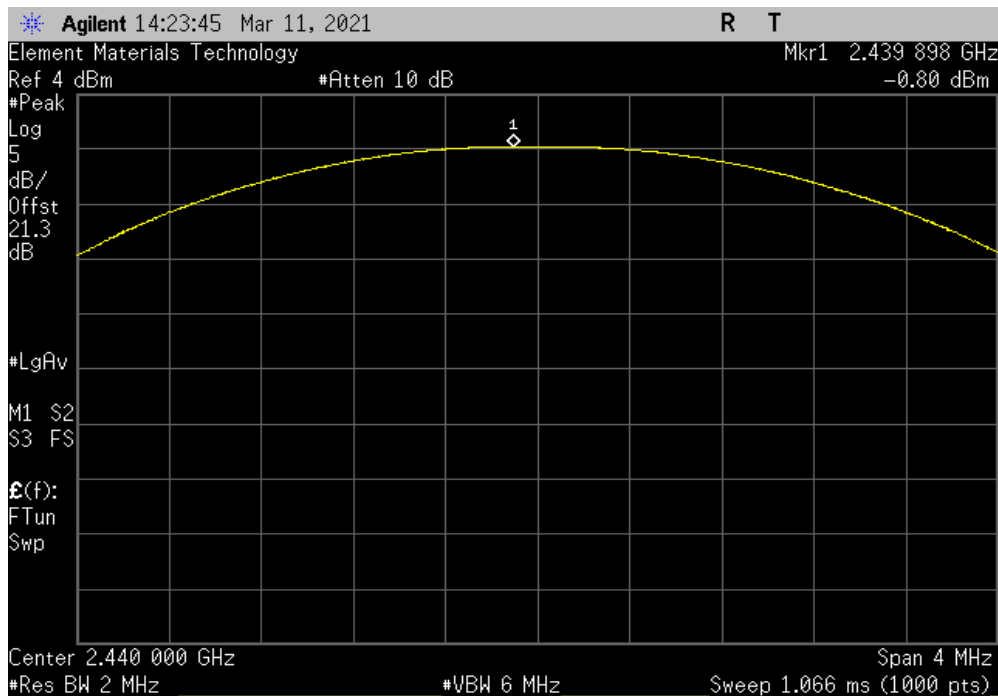


TuTx 2019.08.30.0 XMI 2020.12.30.0

2DH5, pi/4-DQPSK, Low Channel (2402 MHz)						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	-0.756	4	3.244	27	Pass	



2DH5, pi/4-DQPSK, Mid Channel (2440 MHz)						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	-0.795	4	3.205	27	Pass	

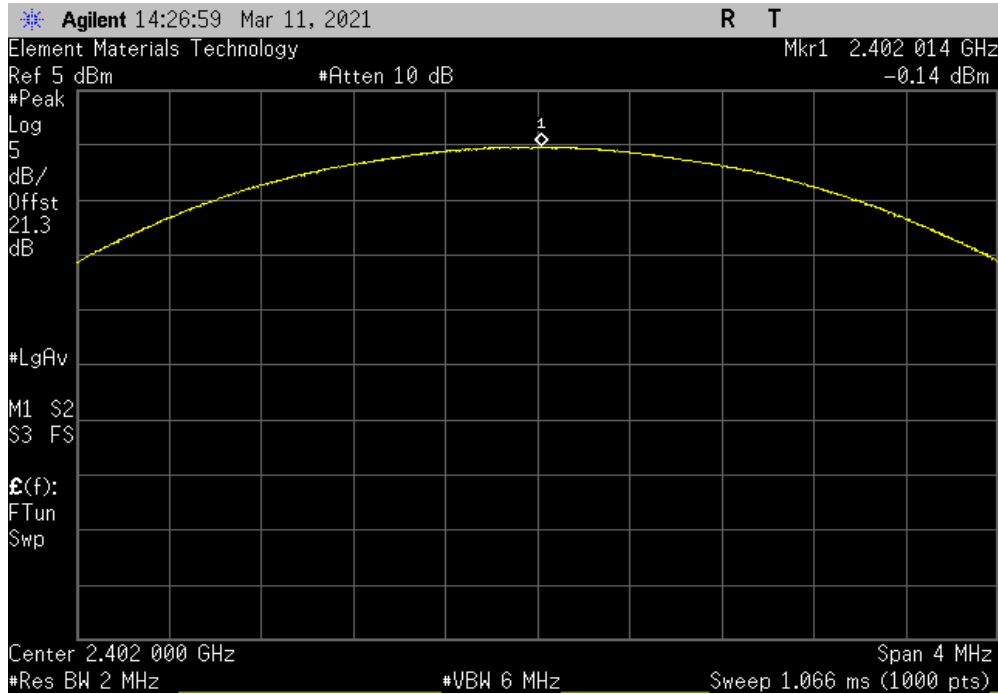


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP) (Low AND Mid Channel)

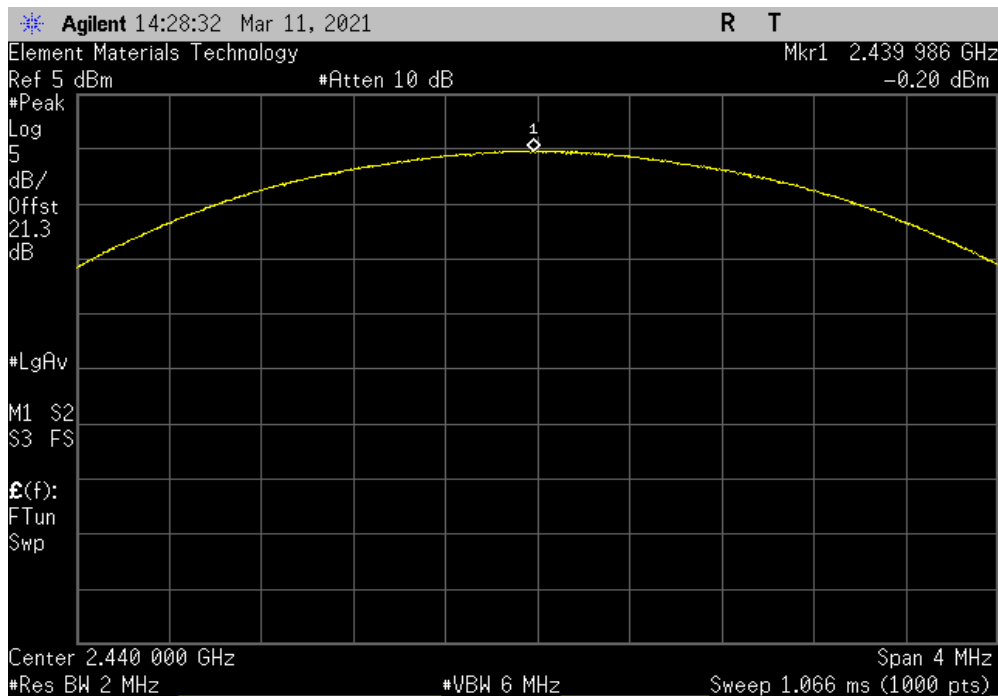


TuTx 2019.08.30.0 XMt 2020.12.30.0

3DH5, 8-DPSK, Low Channel (2402 MHz)						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-0.142	4	3.858	27	Pass		



3DH5, 8-DPSK, Mid Channel (2440 MHz)						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-0.199	4	3.801	27	Pass		



OCCUPIED BANDWIDTH (High Channel)



element

XMI 2020.12.30.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5171B (EXG)	TEY	2019-12-31	2022-12-31
Block - DC	Fairview Microwave	SD3379	AMZ	2020-11-04	2021-11-04
Attenuator	Fairview Microwave	18B5W-26	RFY	2020-06-03	2021-06-03
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2020-09-14	2021-09-14
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2020-05-07	2021-05-07

TEST DESCRIPTION

The 20 dB occupied bandwidth was measured with the EUT set to low, medium and high transmit frequencies in the band. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode.

OCCUPIED BANDWIDTH (High Channel)



TelTx 2019.08.30.0 XMI 2020.12.30.0

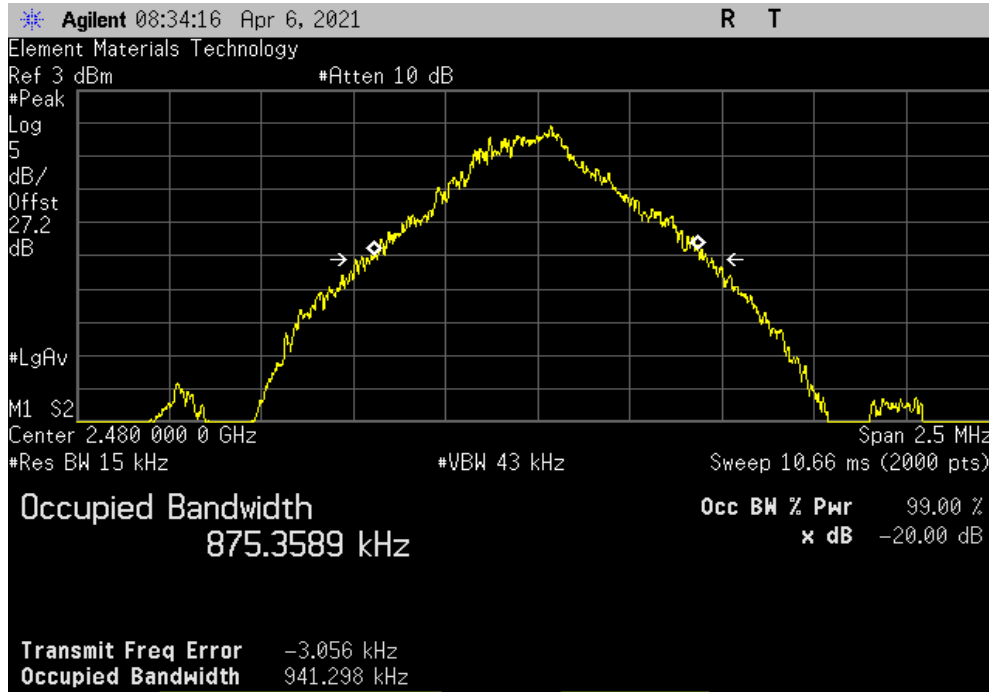
EUT: SOMA3703-32-1780AKIR-A / 1027255 Rev B		Work Order: LGPD0256
Serial Number: 2420M00120		Date: 6-Apr-21
Customer: Logic PD, Inc.		Temperature: 21.3 °C
Attendees: Eric Fritz		Humidity: 40.3% RH
Project: None		Barometric Pres.: 1009 mbar
Tested by: Andrew Rogstad	Power: 120VAC/60Hz	Job Site: MN08
TEST SPECIFICATIONS		
FCC 15.247:2021		Test Method: ANSI C63.10:2013
COMMENTS		
Reference level offset includes measurement cable, attenuator, and DC block.		
DEVIATIONS FROM TEST STANDARD		
None		
Configuration #	3	Signature <i>Andrew Rogstad</i>
		Value Limit (<) Result
DH5, GFSK	High Channel (2480 MHz)	941.298 kHz 1.5 MHz Pass
2DH5, pi/4-DQPSK	High Channel (2480 MHz)	1.357 MHz 1.5 MHz Pass
3DH5, 8-DPSK	High Channel (2480 MHz)	1.369 MHz 1.5 MHz Pass

OCCUPIED BANDWIDTH (High Channel)

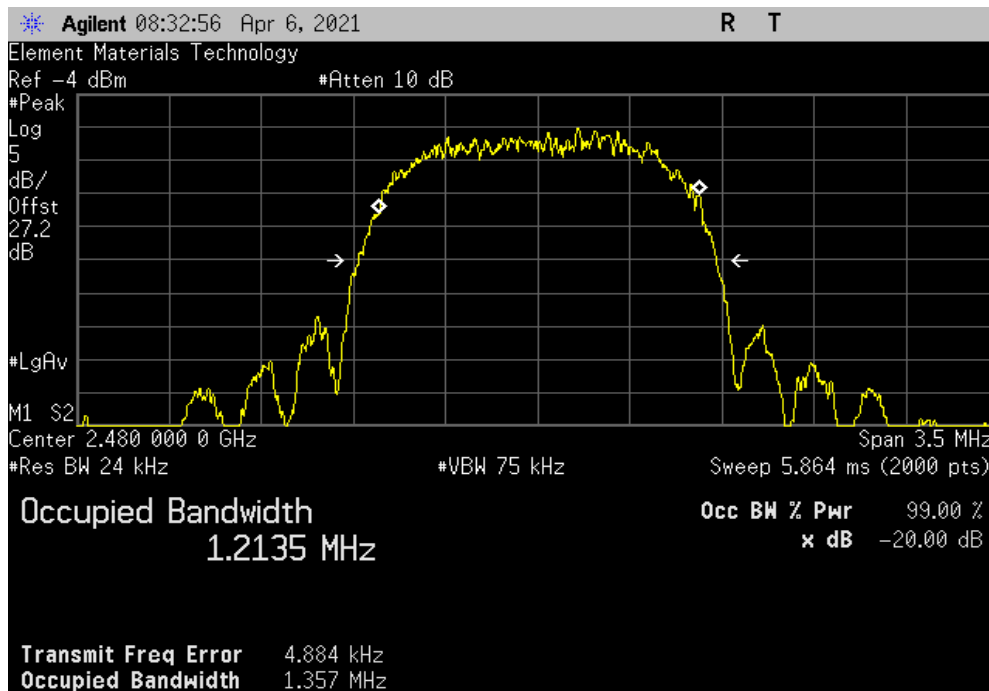


TuTx 2019.08.30.0 XMI 2020.12.30.0

DH5, GFSK, High Channel (2480 MHz)			
	Value	Limit (<)	Result
	941.298 kHz	1.5 MHz	Pass



2DH5, pi/4-DQPSK, High Channel (2480 MHz)			
	Value	Limit (<)	Result
	1.357 MHz	1.5 MHz	Pass

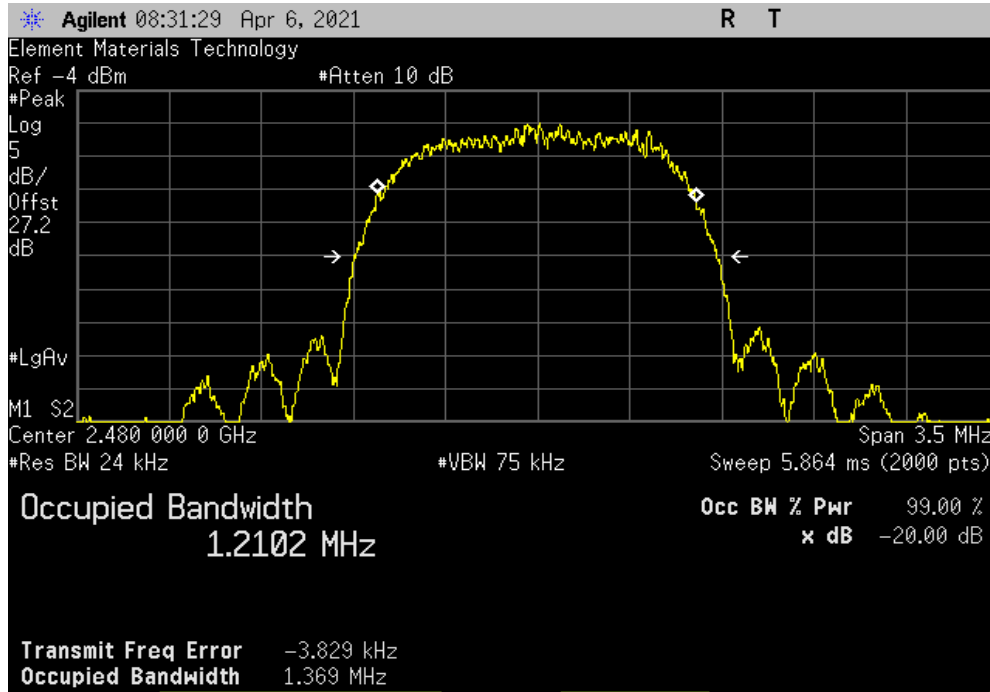


OCCUPIED BANDWIDTH (High Channel)



TbTx 2019.08.30.0 XMI 2020.12.30.0

3DH5, 8-DPSK, High Channel (2480 MHz)			
	Value	Limit (<)	Result
	1.369 MHz	1.5 MHz	Pass



OCCUPIED BANDWIDTH (Low AND Mid Channel)



XMIT 2020.12.30.0

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	E4422B	TGQ	2021-03-24	2024-03-24
Block - DC	Fairview Microwave	SD3379	AMZ	2020-11-04	2021-11-04
Attenuator	S.M. Electronics	SA26B-20	RFW	2021-02-05	2022-02-05
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2020-09-14	2021-09-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	2020-07-14	2021-07-14

TEST DESCRIPTION

The 20 dB occupied bandwidth was measured with the EUT set to low, medium and high transmit frequencies in the band. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode.

OCCUPIED BANDWIDTH (Low AND Mid Channel)



Tel: 2019.08.30.0 XM: 2020.12.30.0

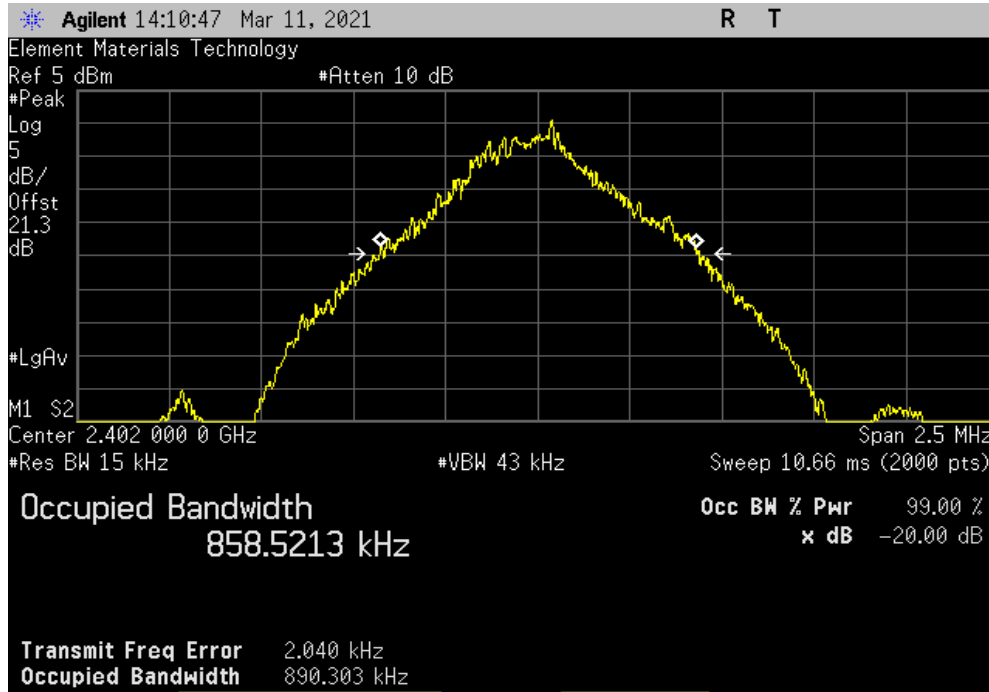
EUT: SOMA3703-32-1780AKIR-A / 1027255 Rev B		Work Order: LGPD0256
Serial Number: 2420M00120		Date: 14-Apr-21
Customer: Logic PD, Inc.		Temperature: 23.1 °C
Attendees: Eric Fritz		Humidity: 30.2% RH
Project: None		Barometric Pres.: 1021 mbar
Tested by: Andrew Rogstad	Power: 120VAC/60Hz	Job Site: MN08
TEST SPECIFICATIONS		
FCC 15.247:2021		Test Method: ANSI C63.10:2013
COMMENTS		
Reference level includes measurement cable, attenuator, and DC block.		
DEVIATIONS FROM TEST STANDARD		
None		
Configuration #	3	Signature <i>Andrew Rogstad</i>
		Value Limit (<) Result
DH5, GFSK	Low Channel (2402 MHz)	890.304 kHz 1.5 MHz Pass
	Mid Channel (2440 MHz)	919.888 kHz 1.5 MHz Pass
2DH5, pi/4-DQPSK	Low Channel (2402 MHz)	1.345 MHz 1.5 MHz Pass
	Mid Channel (2440 MHz)	1.35 MHz 1.5 MHz Pass
3DH5, 8-DPSK	Low Channel (2402 MHz)	1.375 MHz 1.5 MHz Pass
	Mid Channel (2440 MHz)	1.37 MHz 1.5 MHz Pass

OCCUPIED BANDWIDTH (Low AND Mid Channel)

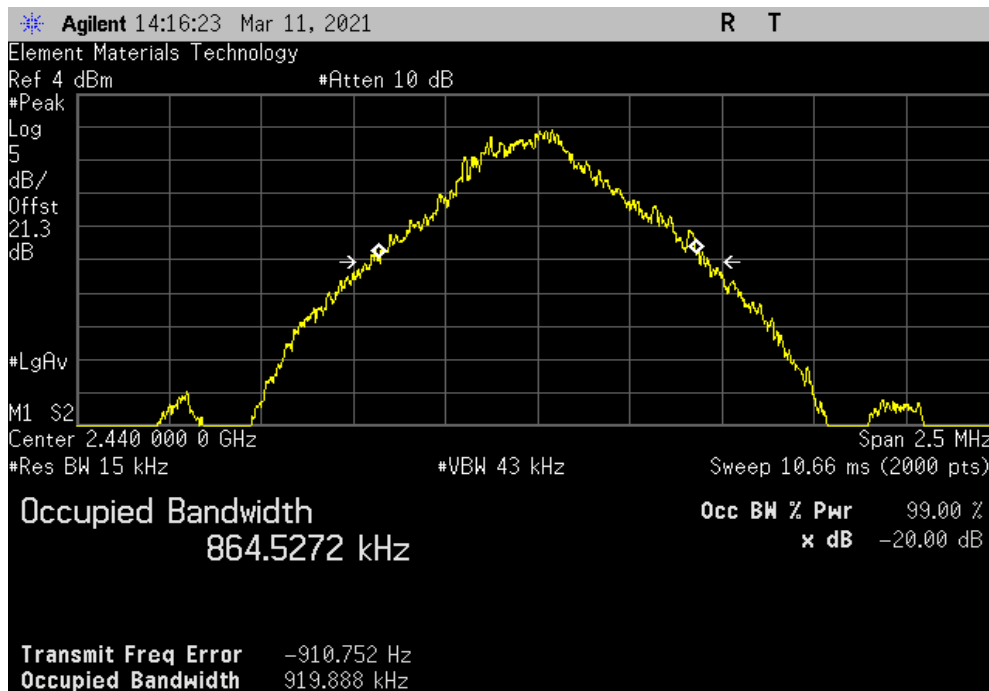


TbTx 2019.08.30.0 XMI 2020.12.30.0

DH5, GFSK, Low Channel (2402 MHz)				Value	Limit (<)	Result
				890.304 kHz	1.5 MHz	Pass



DH5, GFSK, Mid Channel (2440 MHz)				Value	Limit (<)	Result
				919.888 kHz	1.5 MHz	Pass

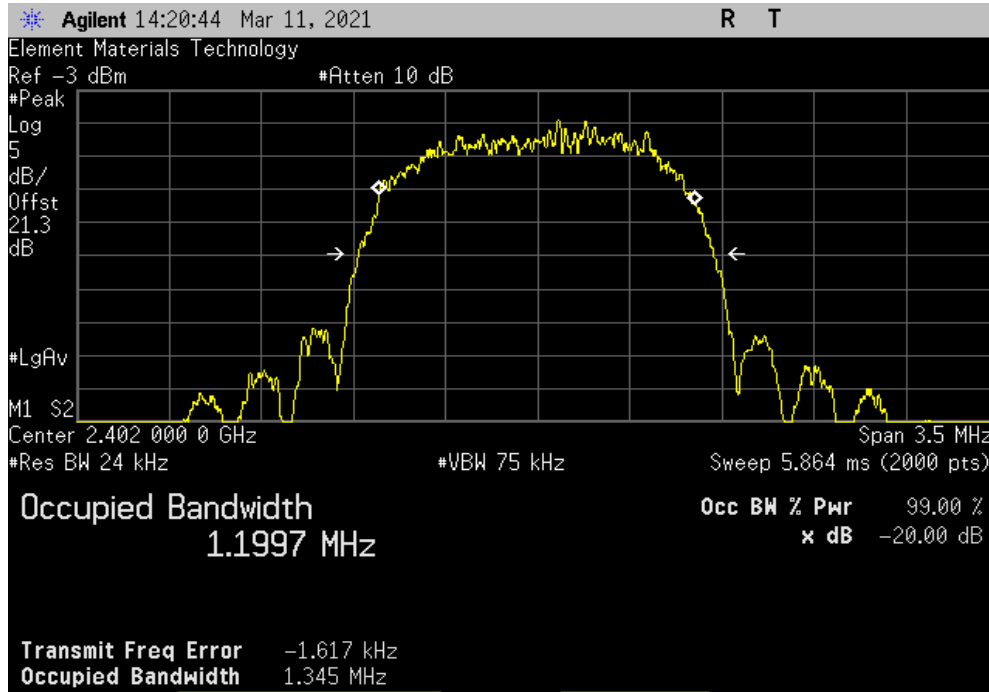


OCCUPIED BANDWIDTH (Low AND Mid Channel)

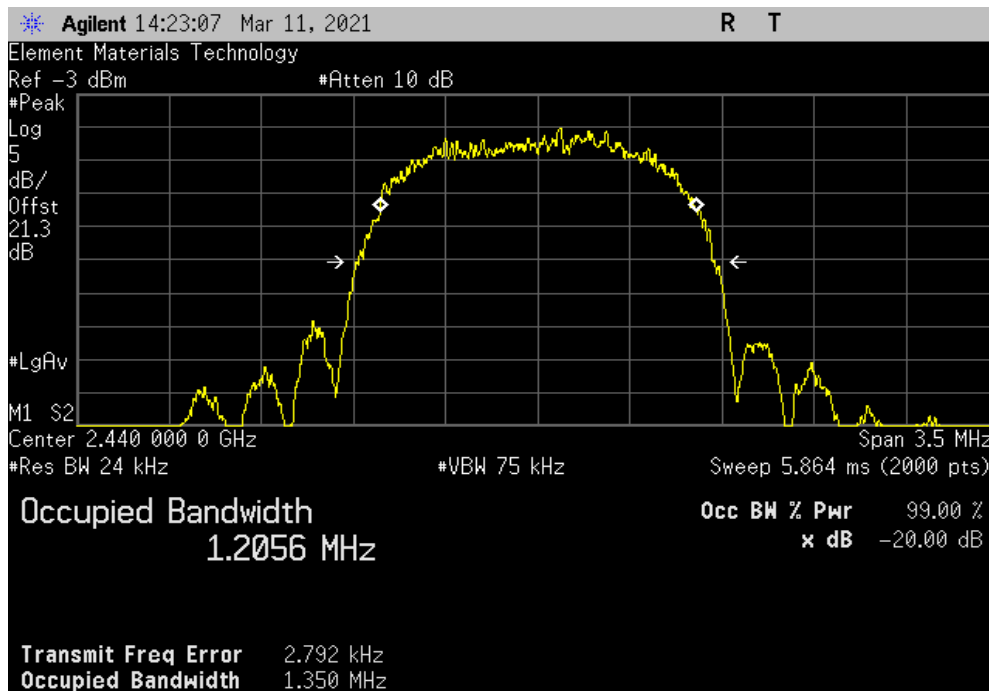


TbTx 2019.08.30.0 XMI 2020.12.30.0

2DH5, pi/4-DQPSK, Low Channel (2402 MHz)						
				Value	Limit (<)	Result
				1.345 MHz	1.5 MHz	Pass



2DH5, pi/4-DQPSK, Mid Channel (2440 MHz)						
				Value	Limit (<)	Result
				1.35 MHz	1.5 MHz	Pass

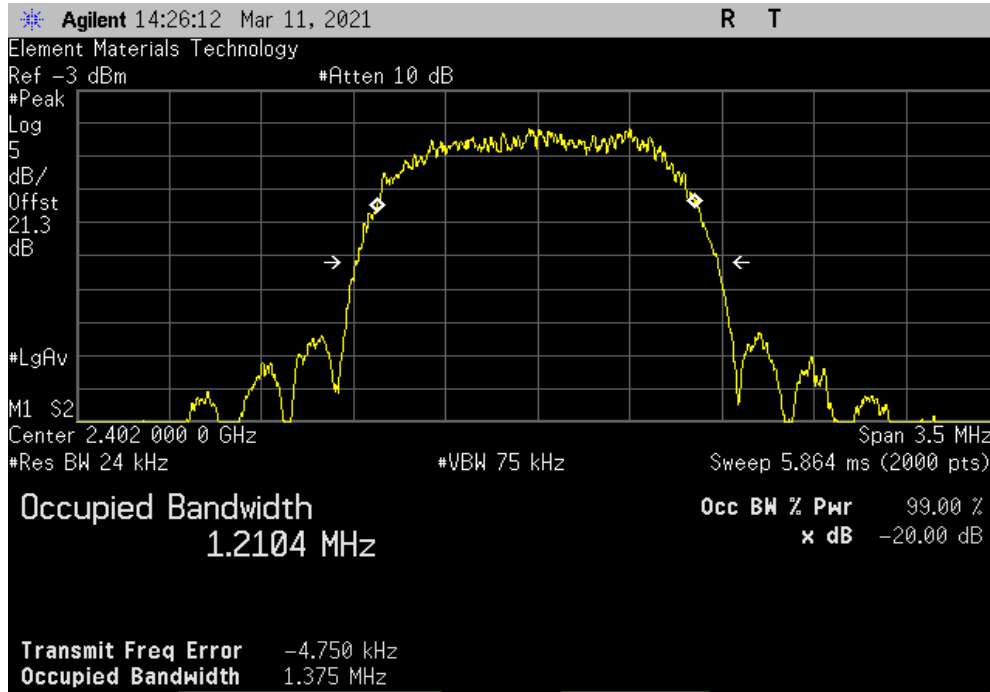


OCCUPIED BANDWIDTH (Low AND Mid Channel)

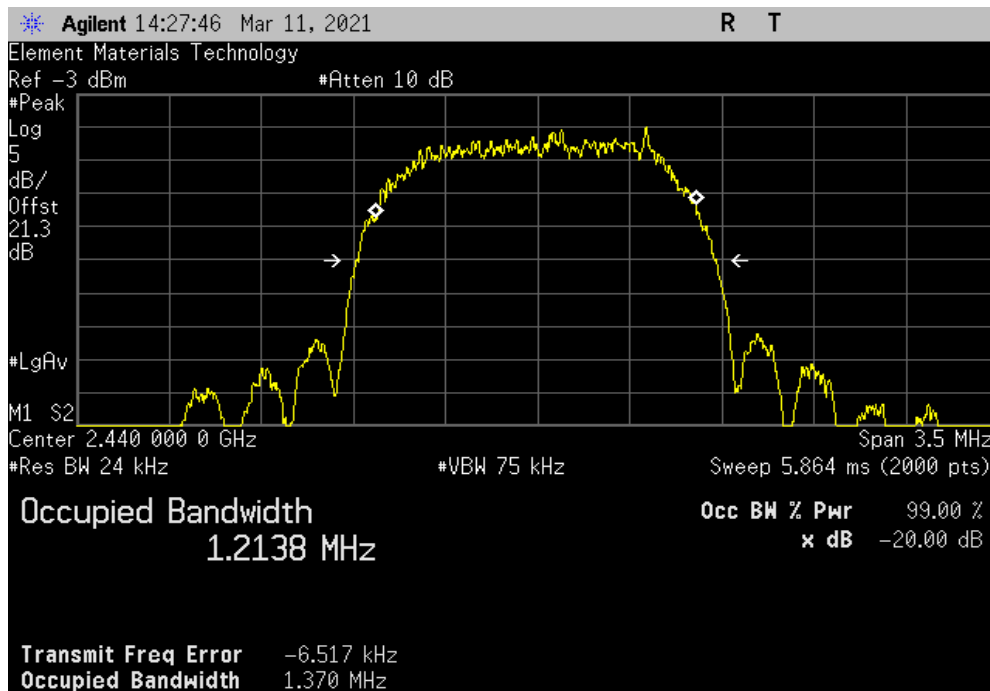


TbTx 2019.08.30.0 XMI 2020.12.30.0

3DH5, 8-DPSK, Low Channel (2402 MHz)						
				Value	Limit (<)	Result
				1.375 MHz	1.5 MHz	Pass



3DH5, 8-DPSK, Mid Channel (2440 MHz)						
				Value	Limit (<)	Result
				1.37 MHz	1.5 MHz	Pass



End of Test Report