

FCC/IC - TEST REPORT

Report Number : **68.950.22.0461.01** Date of Issue: **June 6, 2022**

Model / HVIN : **AP6398S2**

Product Type : Wi-Fi and Bluetooth functionalities module

Applicant : Roboteam Home Technology (Shenzhen) Co., Ltd

Address : 22F, CHANGFU JINMAO BUILDING NO.5 SHIHUA ROAD,
FUTIAN DISTRICT, 518000 SHENZHEN, PEOPLE'S REPUBLIC
OF CHINA

Manufacturer : Roboteam Home Technology (Shenzhen) Co., Ltd

Address : 22F, CHANGFU JINMAO BUILDING NO.5 SHIHUA ROAD,
FUTIAN DISTRICT, 518000 SHENZHEN, PEOPLE'S REPUBLIC
OF CHINA

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including Appendices : **40**

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint
Road 2, Nanshan District
Shenzhen 518052
P.R. China

Telephone: 86 755 8828 6998

Fax: 86 755 8828 5299

FCC Registration No.: 514049

FCC Designation Number: CA5009

IC Registration No.: 10320A

3 Description of the Equipment Under Test

Product:	Wi-Fi and Bluetooth functionalities module
Model no.:	AP6398S2
Brand name:	t e m i
Hardware Version Identification No. (HVIN)	AP6398S2
FCC ID:	2ASJLAP6398S2
IC:	24774-AP6398S2
Options and accessories:	N/A
Rating:	Supplied by 3.3VDC
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	40
Modulation:	GFSK
Antenna Type:	Integrated antenna
Antenna 1	Gain: -0.5dBi
Antenna 2	Gain: -2.5dBi
Description of the EUT:	The Equipment Under Test (EUT) is a Wi-Fi and Bluetooth functionalities module which support Bluetooth function and Wi-Fi operated at 5GHz and 2.4GHz. Only Bluetooth Low Energy included in this report.

NOTE 1: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

NOTE 2: This report contains two kinds of antenna, they are identical only except antenna gain, testing only performed at the antenna support higher gain.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2020 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-Gen Issue 5 April 2018 + A1 + A2	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 2 February 2017	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and License-Exempt Local Area Network (LE-LAN) Devices

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 Measurement Guidance and ANSI C63.10 (2013).

5 Summary of Test Results

Technical Requirements			
FCC Part 15 Subpart C/ RSS-247 Issue 2/RSS-Gen Issue 5			
Test Condition		Pages	Test Result
§15.207& RSS-Gen 8.8	Conducted emission AC power port	10	Pass
§15.247(b)(1)	Conducted peak output power	13	Pass
RSS-247 5.4(b)	Equivalent Isotropic Radiated Power	13	Pass
§15.247(e) & RSS-247 5.2(b)	Power spectral density	15	Pass
§15.247(a)(2) & RSS-247 5.2(a) & RSS-Gen 6.7	6dB bandwidth and 99% Occupied Bandwidth	18	Pass
§15.247(a)(1) & RSS-247 5.1(a) & RSS-Gen 6.7	20dB bandwidth and 99% Occupied Bandwidth	--	N/A
§15.247(a)(1) & RSS-247 5.1(b)	Min. of Hopping Channel Carrier Frequency Separation	--	N/A
§15.247(a)(1)(iii) & RSS-247 5.1(d)	Min number of hopping frequencies	--	N/A
§15.247(a)(1)(iii) & RSS-247 5.1(d)	Dwell Time - Average Time of Occupancy	--	N/A
§15.247(d) & RSS-247 5.5	Spurious RF conducted emissions	24	Pass
§15.247(d) & RSS-247 5.5	Band edge	32	Pass
§15.247(d) & §15.209 & RSS-247 5.5 & RSS-Gen 6.13	Spurious radiated emissions for transmitter	35	Pass
§15.203 & RSS-Gen 6.8	Antenna requirement	See note 2	Pass

Note 1: N/A=Not Applicable.

Note 2: The EUT uses an external antenna and manufacturer will stick it down with glue, which gain is - 0.5dBi. In accordance to §15.203 & RSS-Gen 6.8, it is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2ASJLAP6398S2, IC: 24774-AP6398S2, complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules and RSS-247, RSS-GEN.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: April 25, 2022

Testing Start Date: April 27, 2022

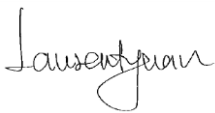
Testing End Date: May 17, 2022

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:

Prepared by:

Tested by:



Laurent Yuan
Section Manager



Alan Xiong
Project Engineer

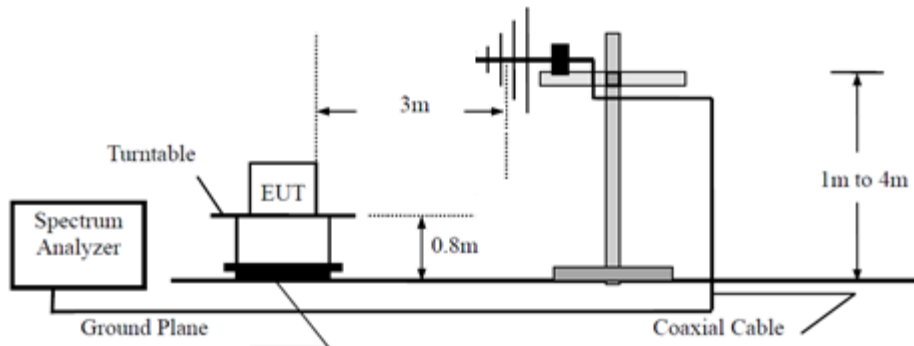


Carry Cai
Test Engineer

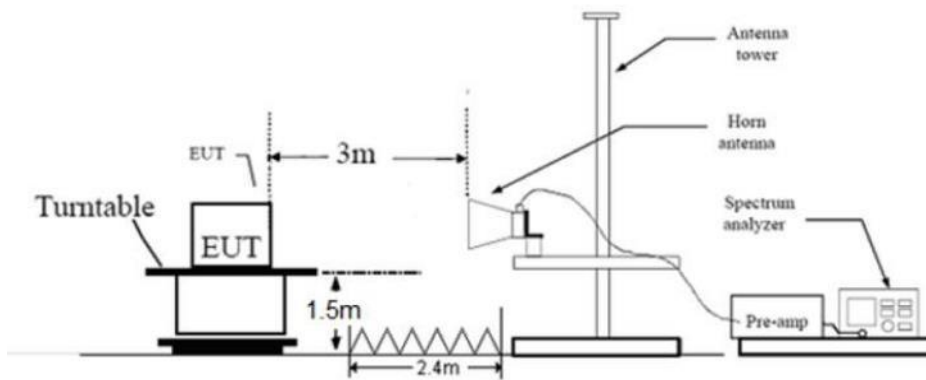
7 Test Setups

7.1 Radiated test setups

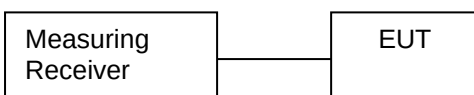
Below 1GHz



Above 1GHz



7.2 Conducted RF test setups



8 Systems Test Configuration

Auxiliary Equipment Used during Test:

Description	Manufacturer	Model NO.	S/N
Laptop	Thinkpad	X230	0A72162
Adapter	HOLOTO	ADS-25FSG-12	12VDC, 2.0A

Cables Used During Test:

Cable	Length	Shielded/unshielded	With / without ferrite
USB Cable	1.0m	Shielded	Without ferrite

The system was configured to hopping mode and non-hopping mode.

9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

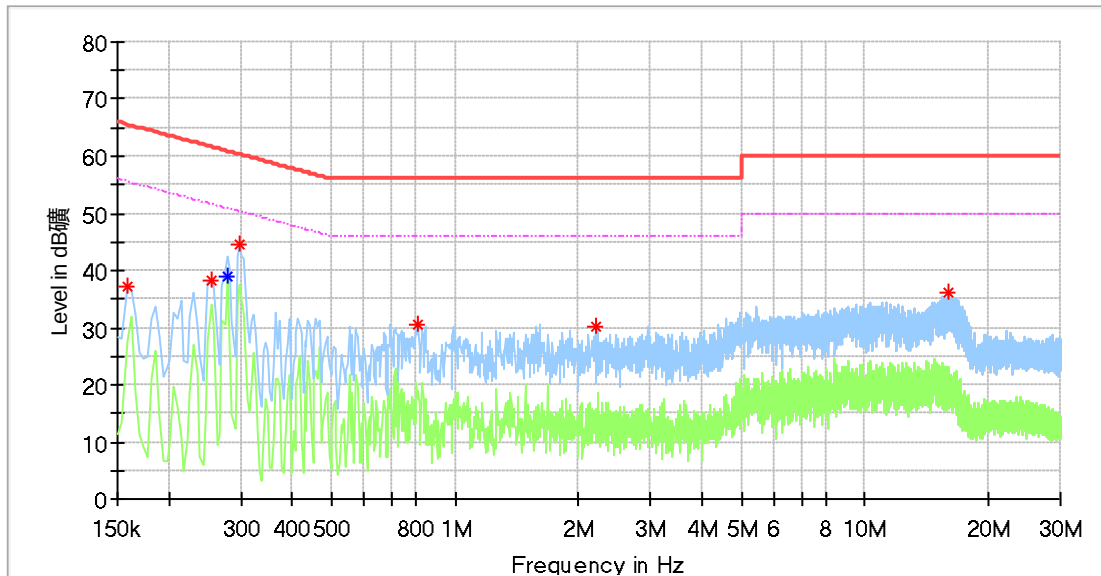
Limit

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Conducted Emission

Product Type : Wi-Fi and Bluetooth functionalities module
 M/N : AP6398S2
 Operating Condition : Normal Working
 Test Specification : Line
 Comment : AC 120V/60Hz



Frequency (MHz)	Max Peak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.158000	37.05	---	65.57	28.52	L1	9.74
0.254000	38.15	---	61.63	23.47	L1	9.67
0.278000	---	38.93	50.88	11.95	L1	9.66
0.298000	44.58	---	60.30	15.72	L1	9.66
0.814000	30.60	---	56.00	25.40	L1	9.66
2.198000	30.27	---	56.00	25.73	L1	9.70
15.962000	36.27	---	60.00	23.73	L1	10.24

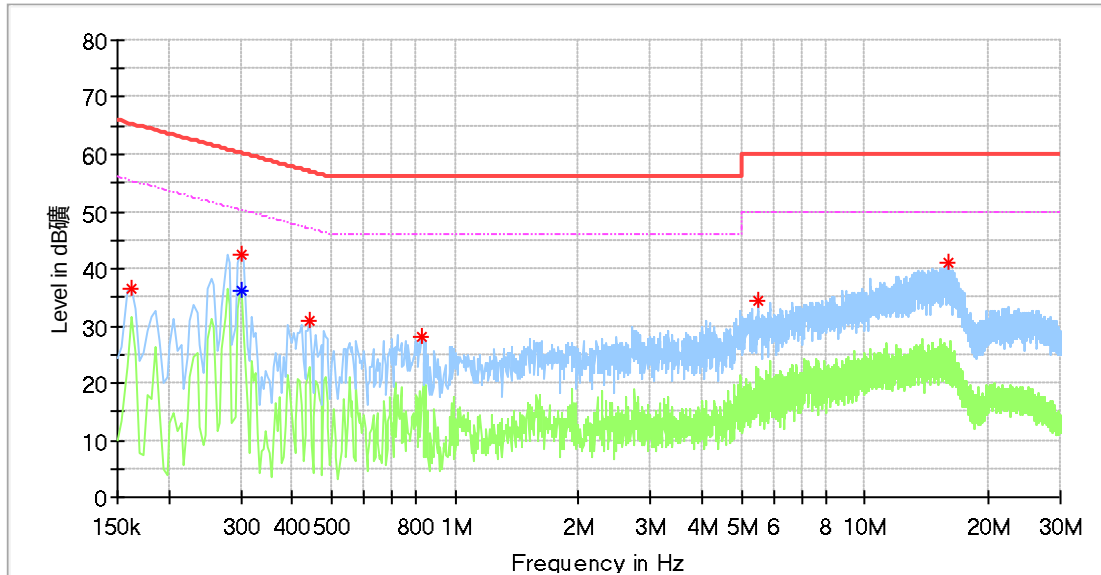
Remark:

Max Peak= Read level + Corrector factor

Correct factor=cable loss + LISN factor

Conducted Emission

Product Type : Wi-Fi and Bluetooth functionalities module
 M/N : AP6398S2
 Operating Condition : Normal Working
 Test Specification : Neutral
 Comment : AC 120V/60Hz



Frequency (MHz)	Max Peak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.162000	36.62	---	65.36	28.74	N	9.77
0.302000	---	36.10	50.19	14.08	N	9.70
0.302000	42.49	---	60.19	17.69	N	9.70
0.442000	30.80	---	57.02	26.23	N	9.68
0.826000	28.05	---	56.00	27.95	N	9.69
5.510000	34.35	---	60.00	25.65	N	9.90
15.914000	40.94	---	60.00	19.06	N	10.36

Remark:

Max Peak= Read level + Corrector factor

Correct factor=cable loss + LISN factor

9.2 Conducted Peak Output Power & EIRP

Test Method

1. The RF output of EUT was connected to the power meter by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following test receiver settings:
Span = approximately 5 times the 6dB bandwidth, centered on a hopping channel
RBW > the 6dB bandwidth of the emission being measured, VBW $\geq$ 3RBW,
Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power and record the results in the test report.
5. Repeat above procedures until all frequencies measured were complete.

Limits

According to §15.247 (b) (1) & RSS-247 5.4(b), conducted peak output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤ 1	≤ 30

According to & RSS-247 5.4(b), EIRP limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤ 4	≤ 36

Conducted Peak Output Power & EIRP

Frequency MHz	Mode	Conducted Peak Output Power dBm	Antenna Gain dBi	EIRP dBm	Result
Bottom channel 2402MHz	LE 1M	5.05	-0.5	4.55	Pass
Middle channel 2440MHz	LE 1M	4.33	-0.5	3.83	Pass
Top channel 2480MHz	LE 1M	4.80	-0.5	4.30	Pass
Bottom channel 2402MHz	LE 2M	3.51	-0.5	3.01	Pass
Middle channel 2440MHz	LE 2M	4.46	-0.5	3.96	Pass
Top channel 2480MHz	LE 2M	5.11	-0.5	4.61	Pass

9.3 Power Spectral Density

Test Method

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW $\geq$ 3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power and record the results in the test report.
5. Repeat above procedures until other frequencies measured were completed.

Limit

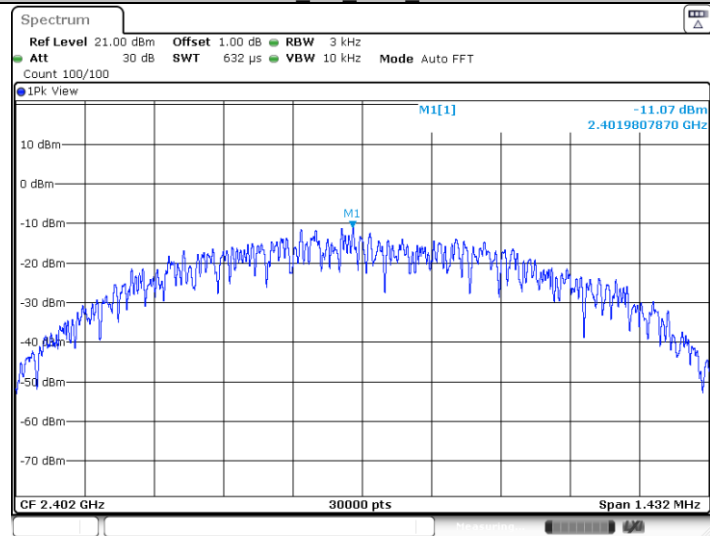
Limit [dBm]

≤ 8

Test result

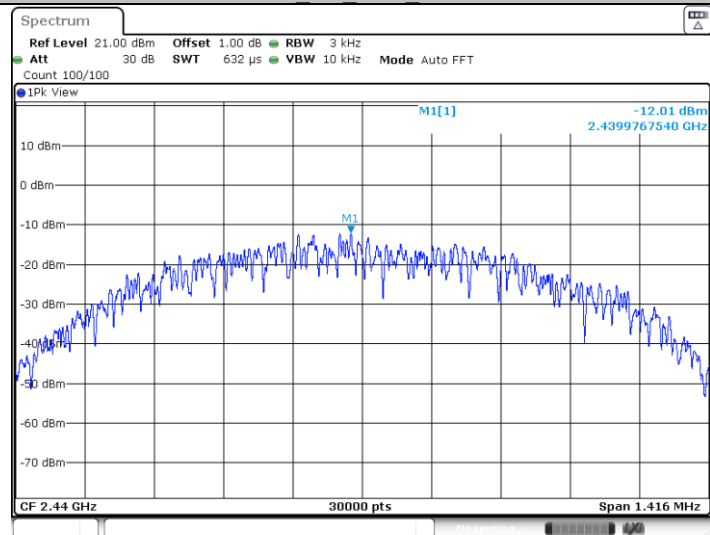
Frequency MHz	Mode	Power spectral density dBm/3KHz	Result
Bottom channel 2402MHz	LE 1M	-11.07	Pass
Middle channel 2440MHz	LE 1M	-12.01	Pass
Top channel 2480MHz	LE 1M	-11.42	Pass
Bottom channel 2402MHz	LE 2M	-15.38	Pass
Middle channel 2440MHz	LE 2M	-14.94	Pass
Top channel 2480MHz	LE 2M	-13.82	Pass

BLE_1M_Ant0_2402



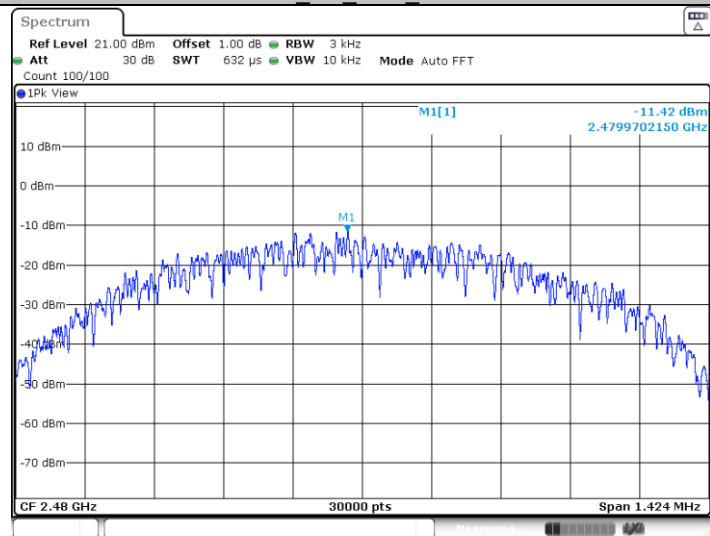
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BLE_1M_Ant0_2440



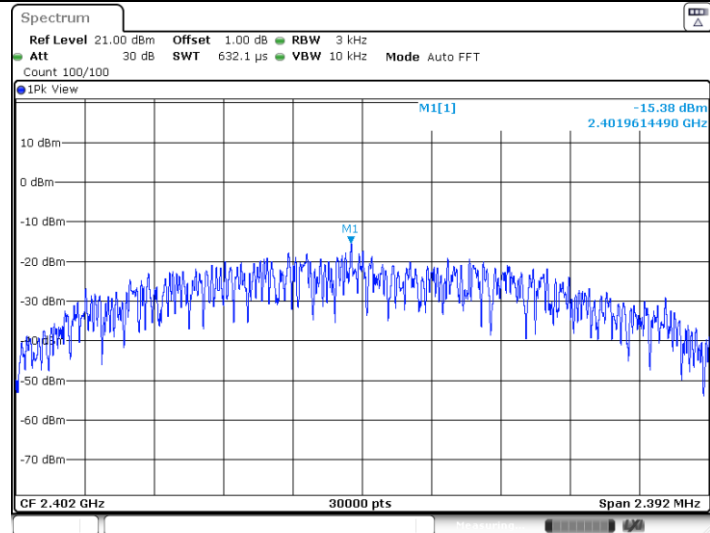
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BLE_1M_Ant0_2480

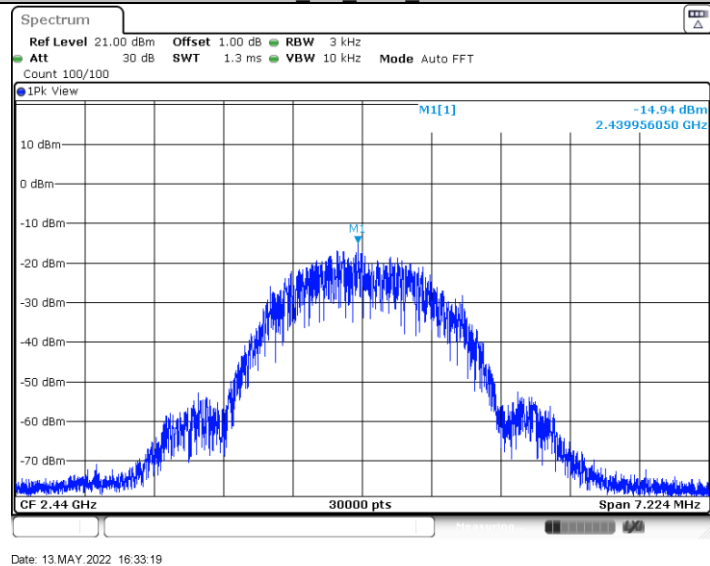


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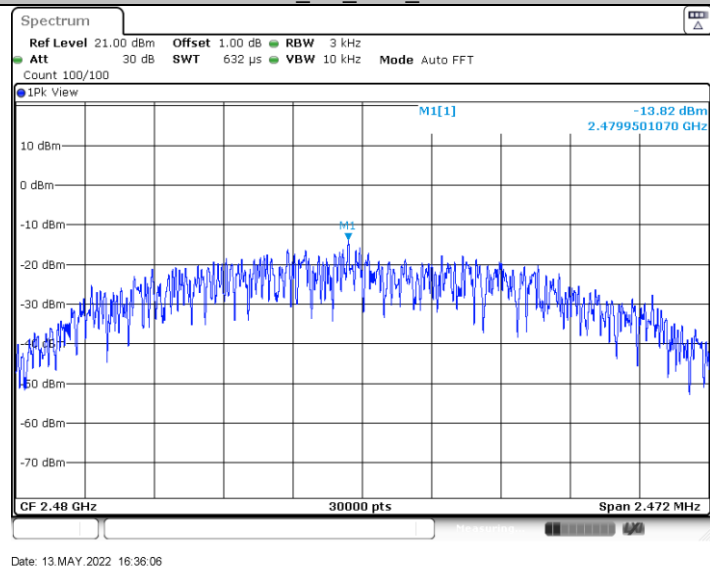
BLE_2M_Ant0_2402



BLE_2M_Ant0_2440



BLE_2M_Ant0_2480



9.4 6 dB Bandwidth and 99% Occupied Bandwidth

Test Method

1. The RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following test receiver settings:
Span = approximately 5 times the 6dB bandwidth, centered on a hopping channel
RBW =100KHz, VBW≥3RBW,
Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth. Record the results.
5. Repeat above procedures until all frequencies measured were complete.

Limit

Limit [kHz]

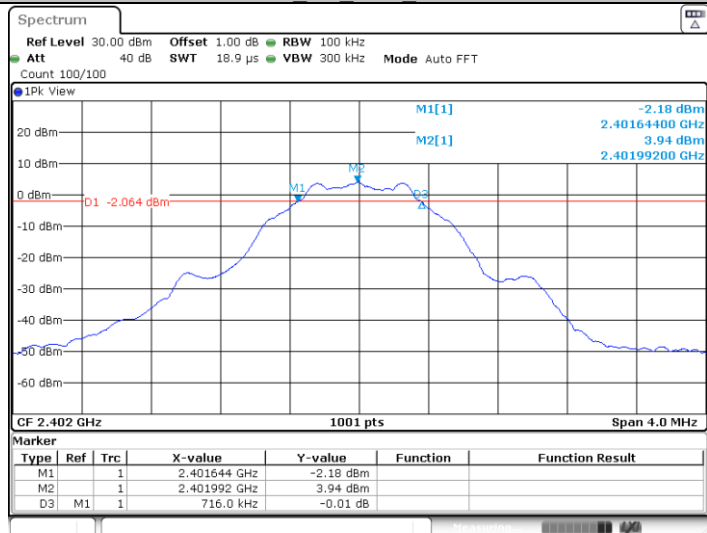
≥500

Test result

Frequency MHz	Mode	6dB bandwidth MHz	99% bandwidth MHz	Result
Bottom channel 2402MHz	LE 1M	0.716	1.055	Pass
Middle channel 2440MHz	LE 1M	0.708	1.055	Pass
Top channel 2480MHz	LE 1M	0.712	1.051	Pass
Bottom channel 2402MHz	LE 2M	1.196	2.042	Pass
Middle channel 2440MHz	LE 2M	1.108	2.078	Pass
Top channel 2480MHz	LE 2M	1.236	2.042	Pass

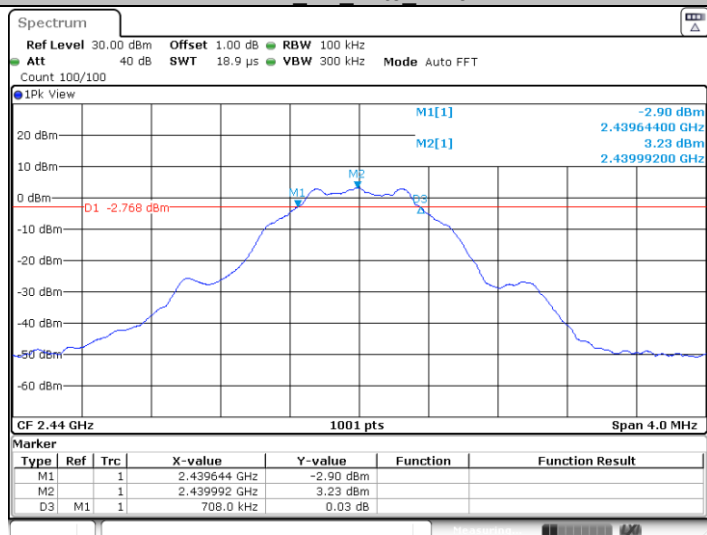
6 dB Bandwidth

BLE_1M_Ant0_2402



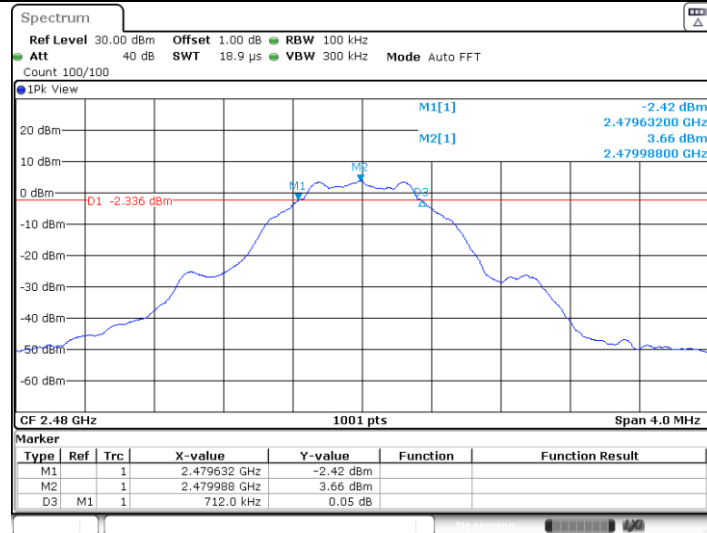
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BLE_1M_Ant0_2440



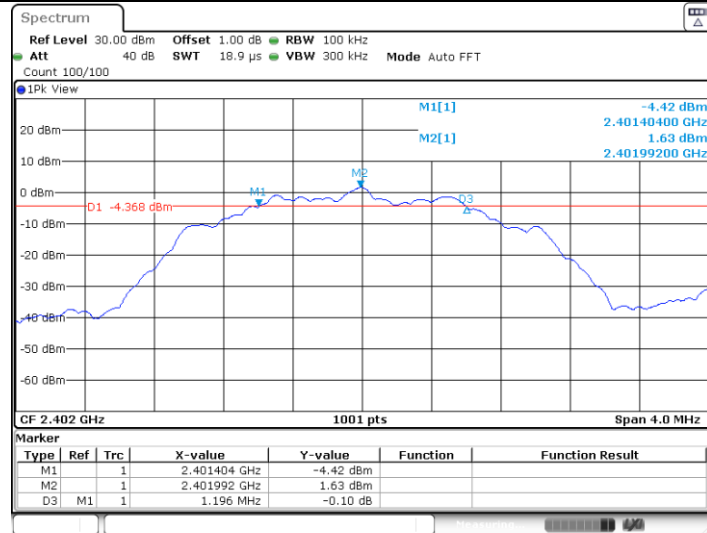
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BLE_1M_Ant0_2480



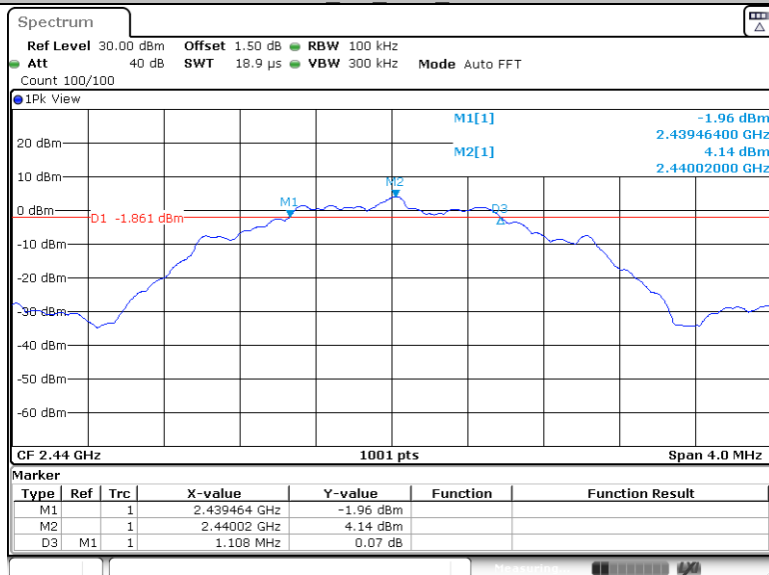
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BLE 2M Ant0 2402

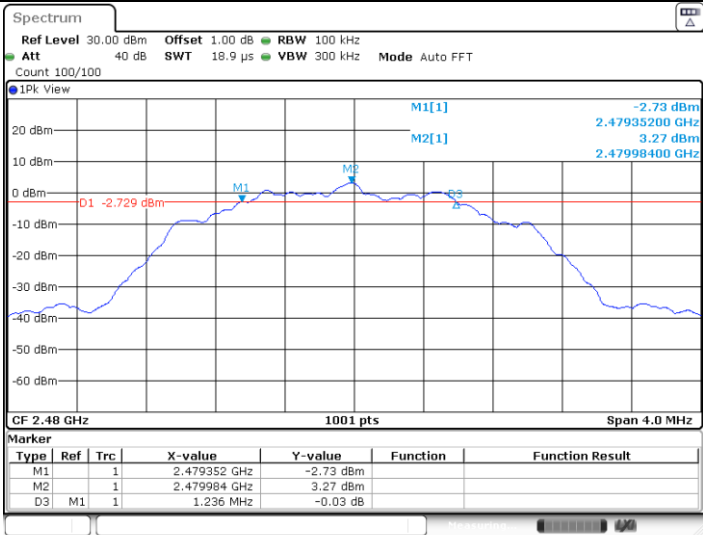


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BLE 2M Ant0 2440



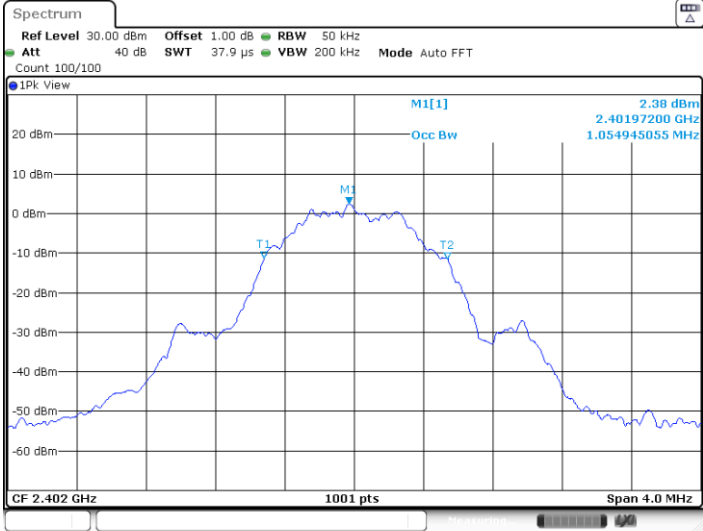
BLE 2M Ant0 2480



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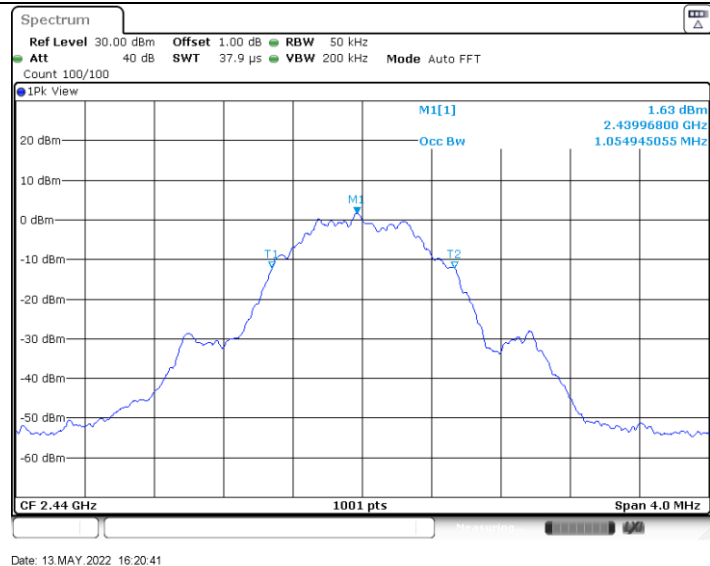
99% Bandwidth

BLE_1M_Ant0_2402

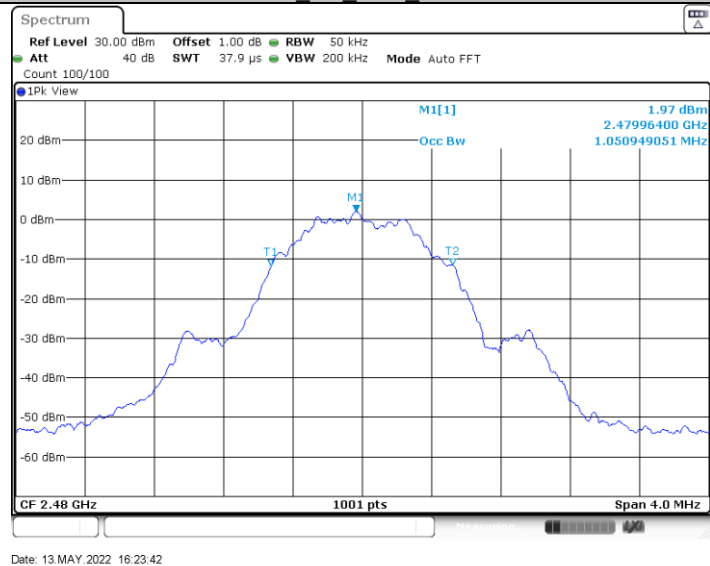


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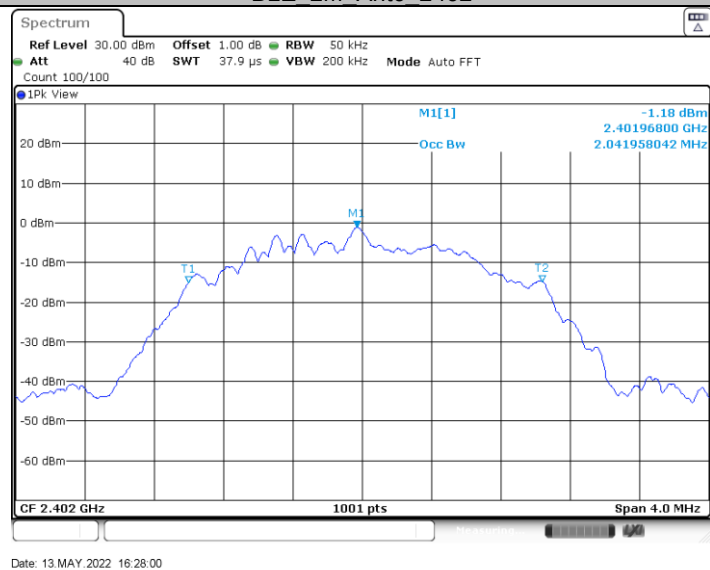
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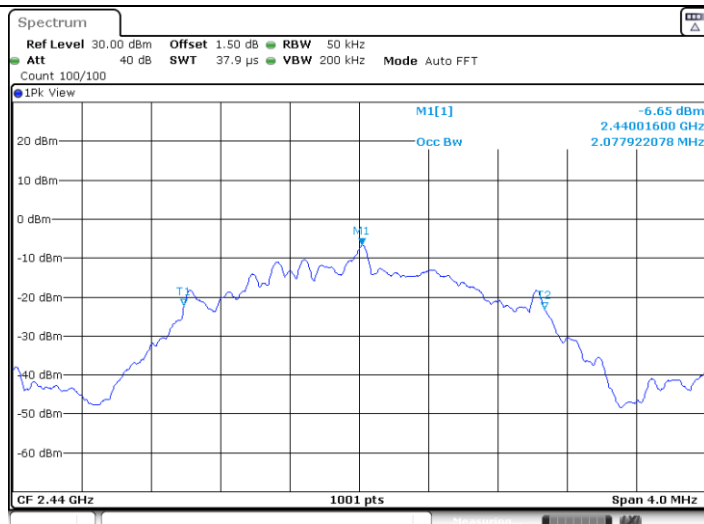
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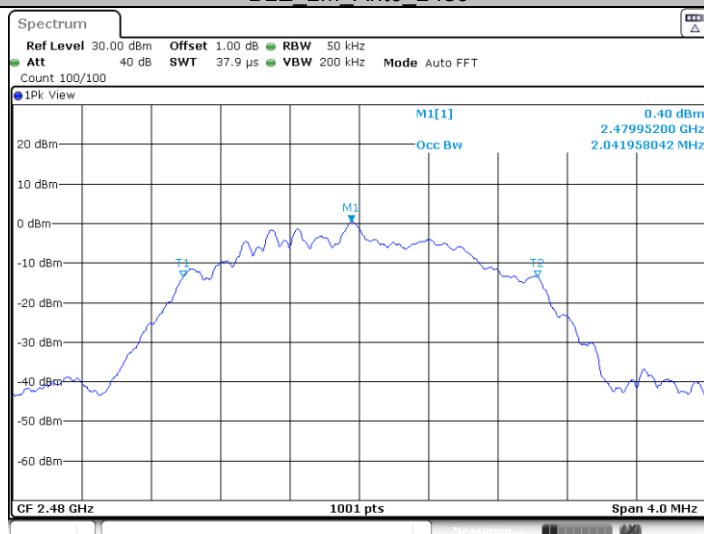
BLE 2M_Ant0_2402



BLE 2M_Ant0_2440



BLE 2M Ant0_2480



Date: 13 MAY 2022 16:35:53

9.5 Spurious RF Conducted Emissions

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency

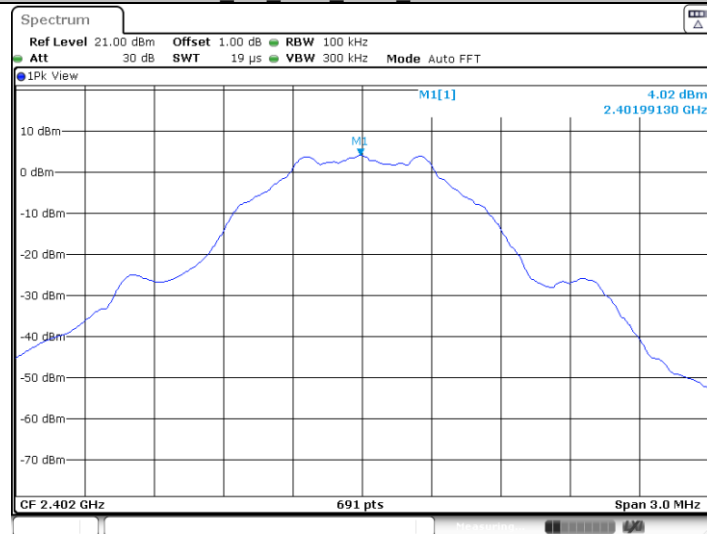
Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

Spurious RF conducted emissions

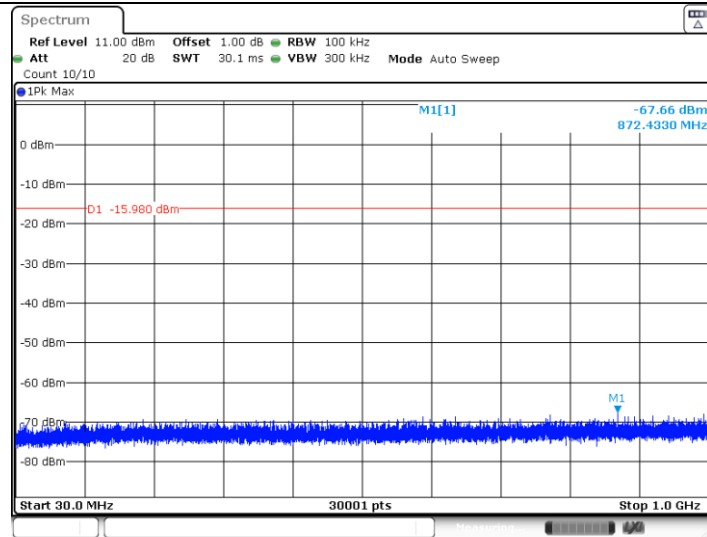
Test Mode	Antenna	Channel (MHz)	Frequency Range (MHz)	Reference Level	Result (dBm)	Limit (dBm)	Verdict
BLE_1M	Ant0	2402	Reference	4.02	4.02	---	PASS
			30~1000	30~1000	-67.66	<=-15.98	PASS
			1000~26500	1000~26500	-45.62	<=-15.98	PASS
		2440	Reference	3.19	3.19	---	PASS
			30~1000	30~1000	-67.2	<=-16.81	PASS
			1000~26500	1000~26500	-48.99	<=-16.81	PASS
		2480	Reference	3.75	3.75	---	PASS
			30~1000	30~1000	-68.12	<=-16.25	PASS
			1000~26500	1000~26500	-50.49	<=-16.25	PASS
BLE_2M	Ant0	2402	Reference	1.69	1.69	---	PASS
			30~1000	30~1000	-67.64	<=-18.31	PASS
			1000~26500	1000~26500	-31.56	<=-18.31	PASS
		2440	Reference	2.41	2.41	---	PASS
			30~1000	30~1000	-67.95	<=-17.59	PASS
			1000~26500	1000~26500	-50.98	<=-17.59	PASS
		2480	Reference	3.25	3.25	---	PASS
			30~1000	30~1000	-67.8	<=-16.75	PASS
			1000~26500	1000~26500	-52.32	<=-16.75	PASS

BLE_1M_Ant0_2402_0-Reference



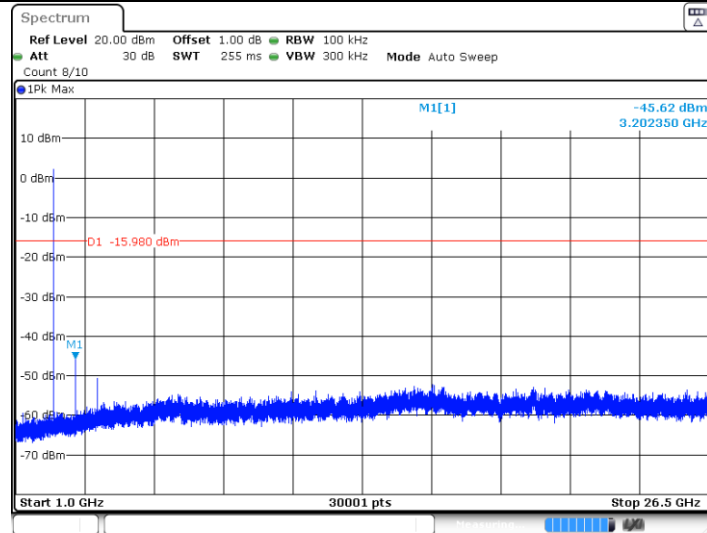
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BLE_1M_Ant0_2402_30~1000



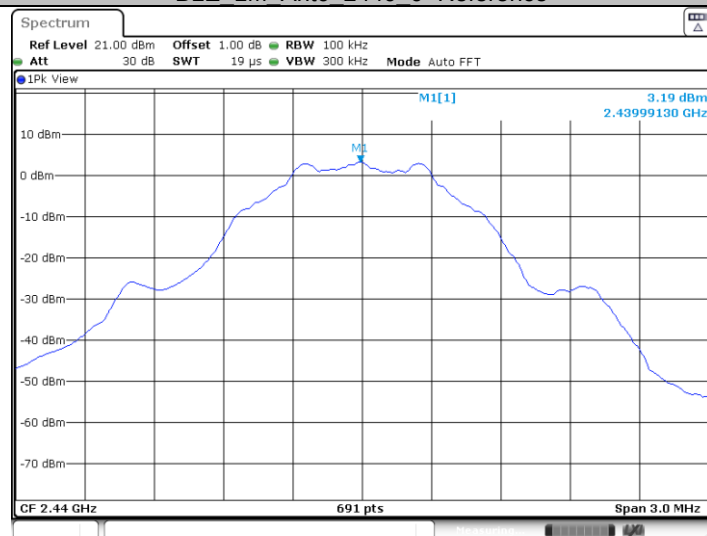
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BLE 1M Ant0 2402 1000~26500



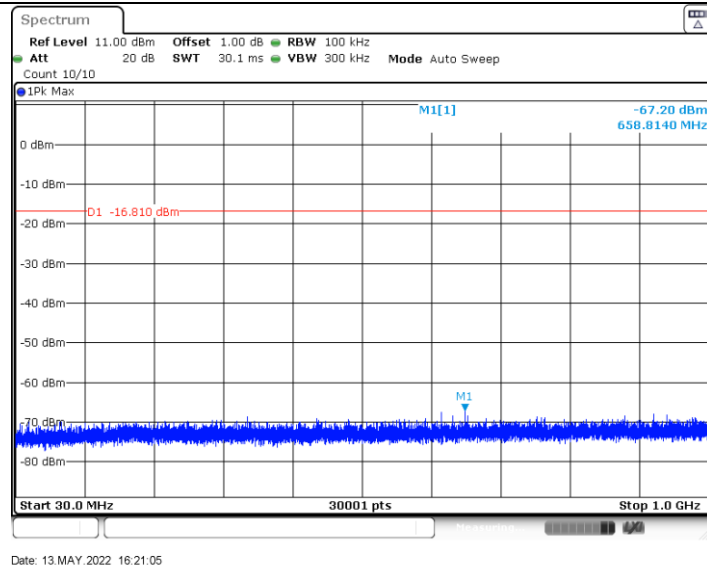
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BLE 1M Ant0 2440 0~Reference

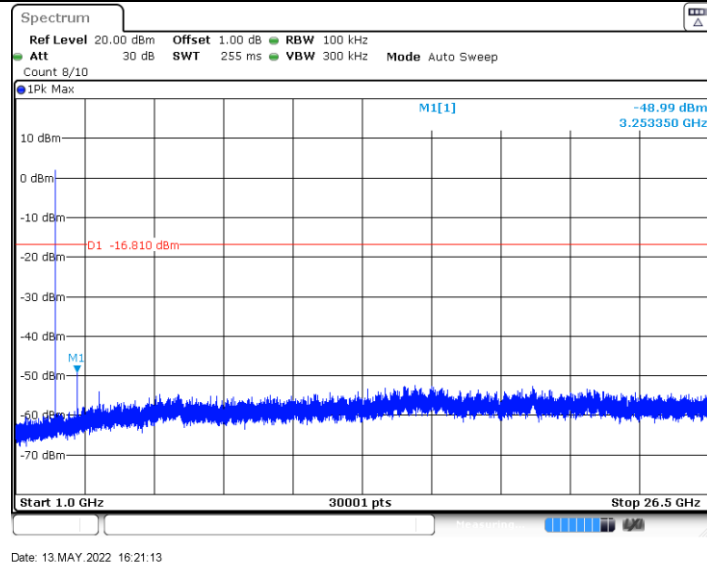


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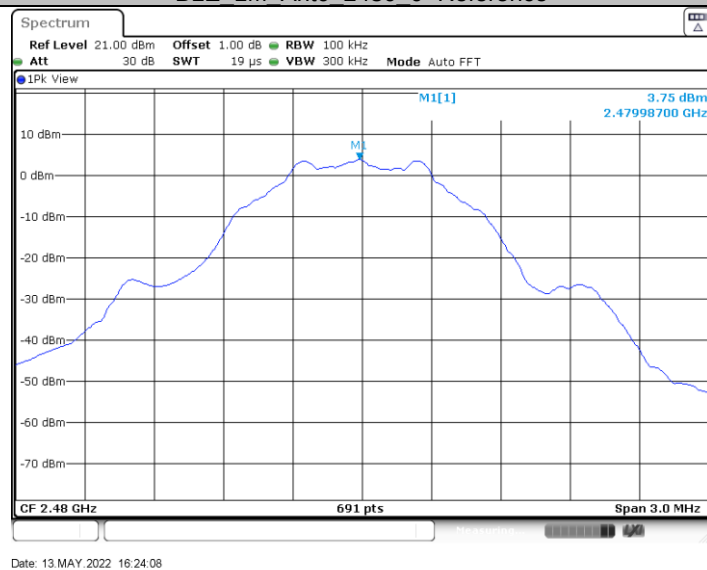
BLE 1M Ant0 2440 30~1000



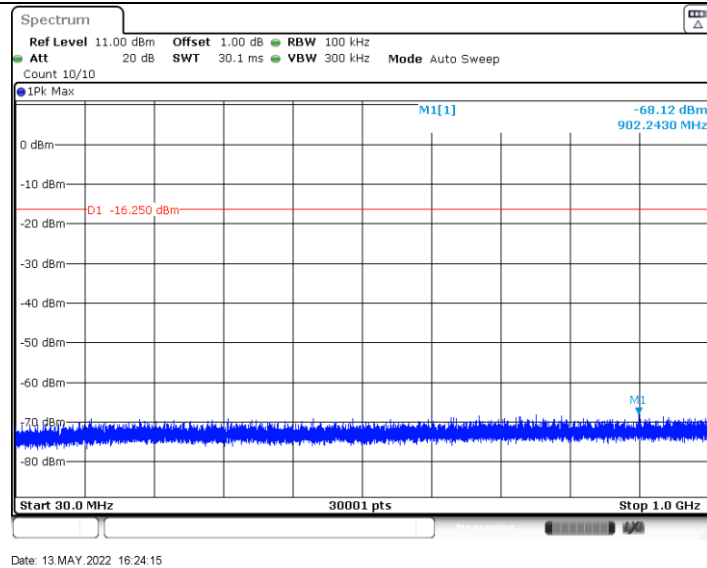
BLE 1M Ant0 2440 1000~26500



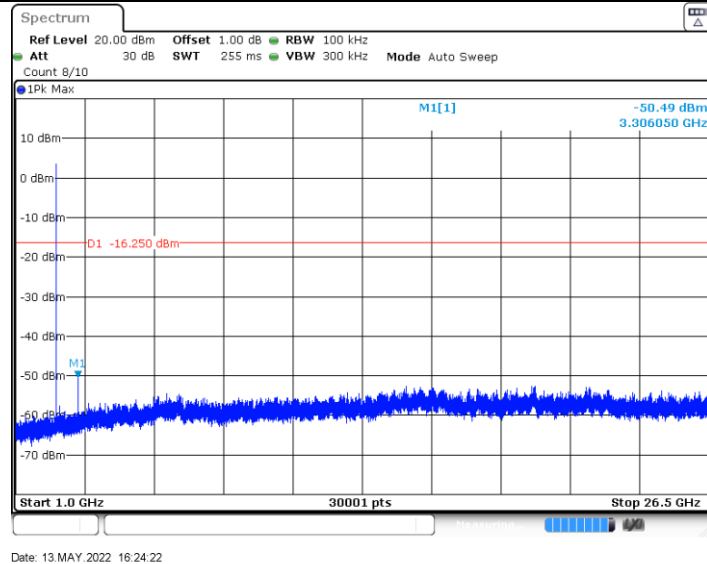
BLE 1M Ant0 2480 0~Reference



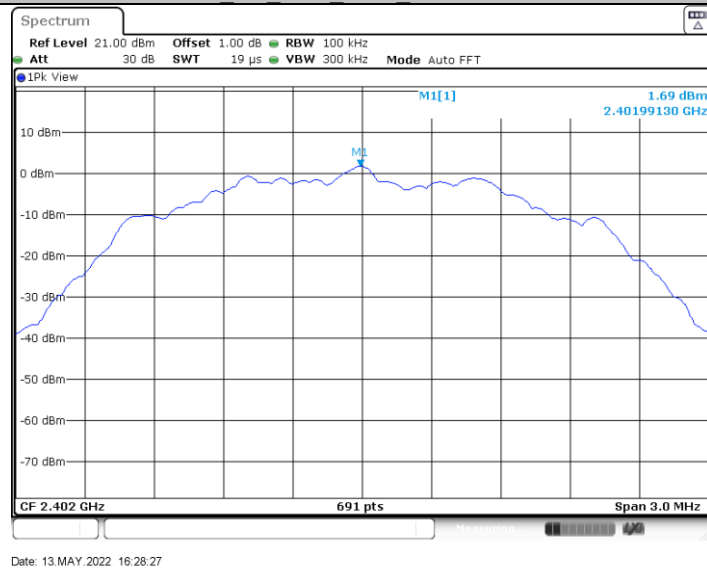
BLE 1M Ant0 2480 30~1000



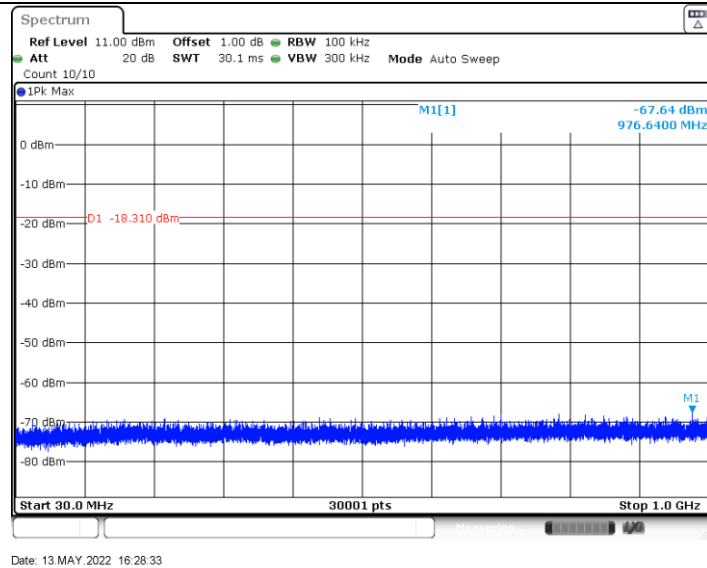
BLE 1M Ant0 2480 1000~26500



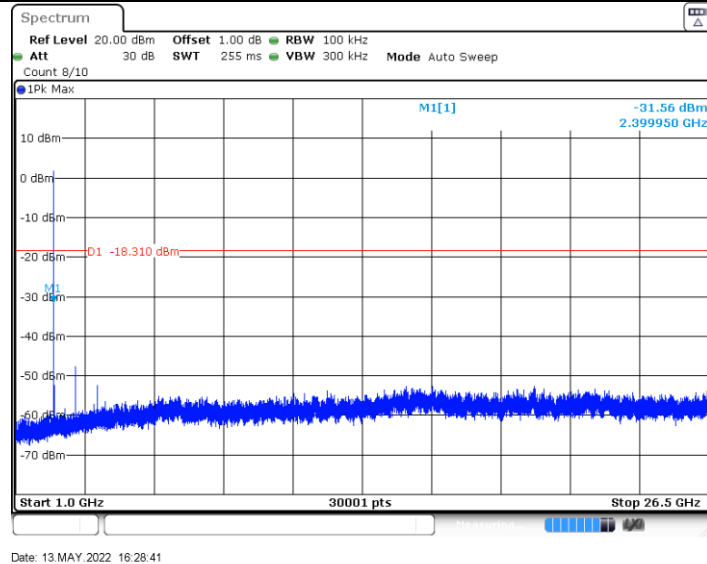
BLE 2M Ant0 2402 0~Reference



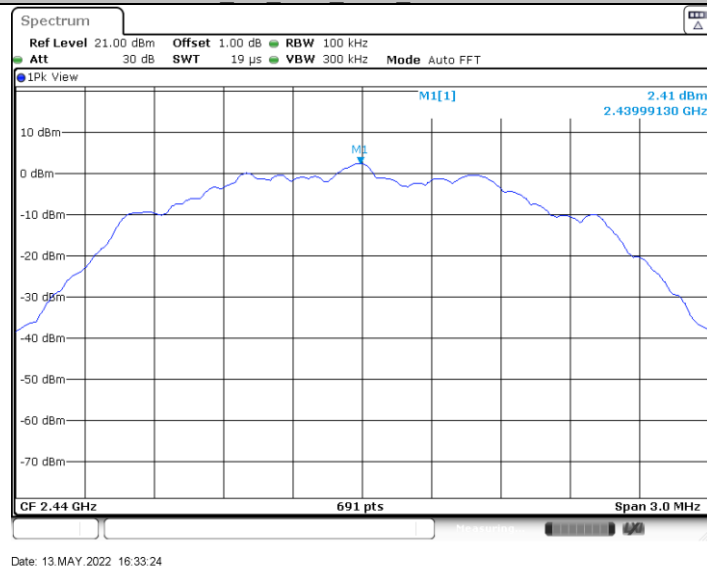
BLE 2M Ant0 2402 30~1000



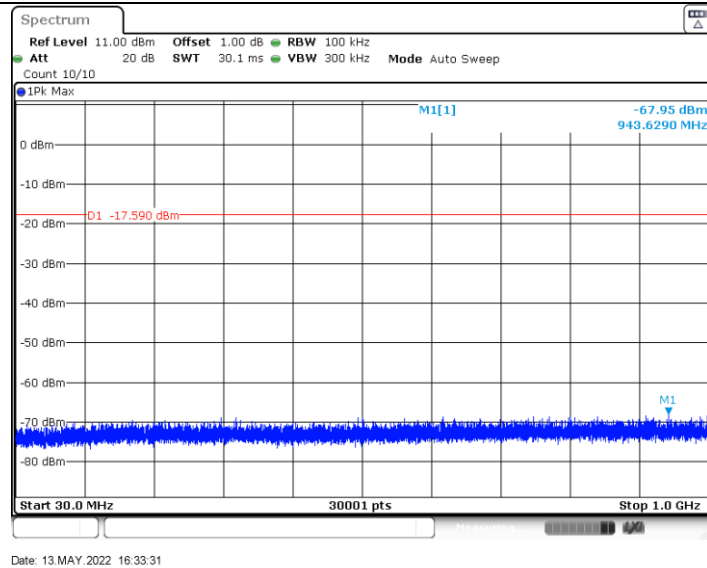
BLE 2M Ant0 2402 1000~26500



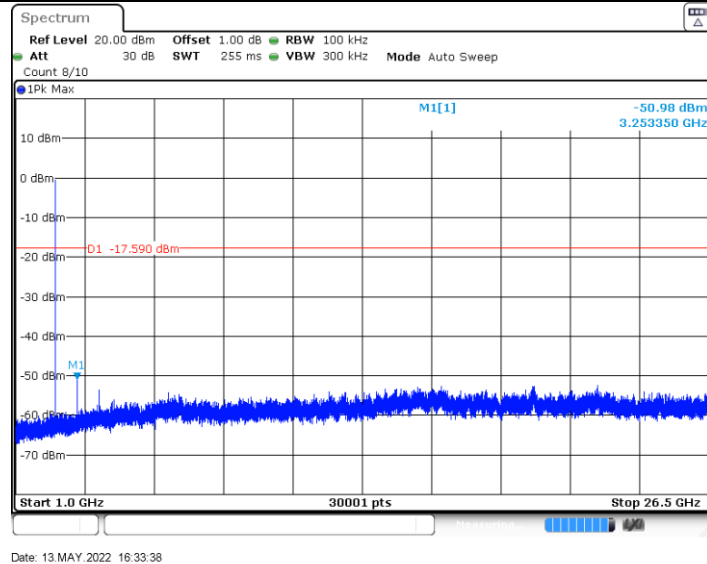
BLE 2M Ant0 2440 0~Reference



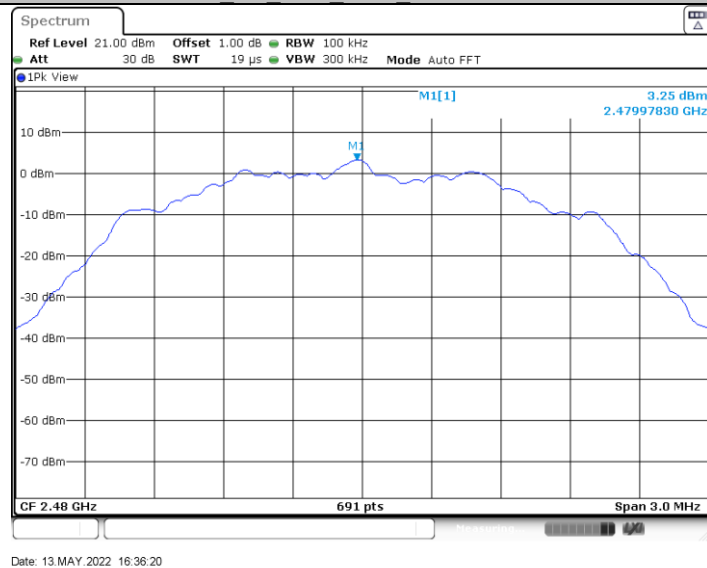
BLE 2M Ant0 2440 30~1000



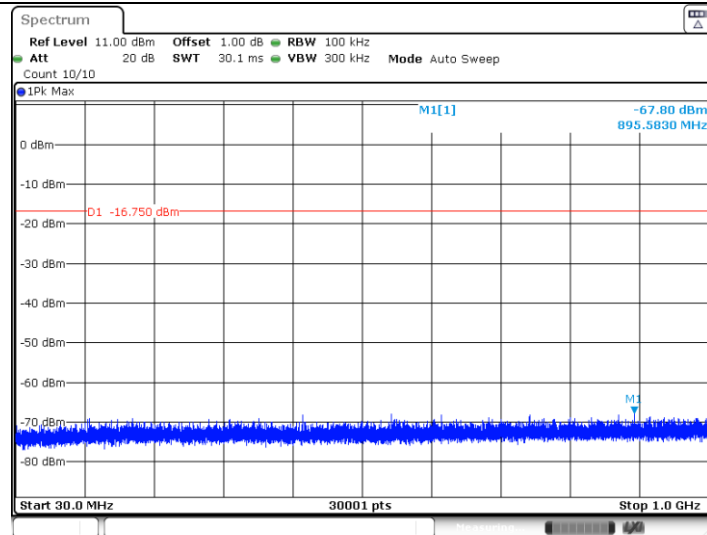
BLE 2M Ant0 2440 1000~26500



BLE 2M Ant0 2480 0~Reference

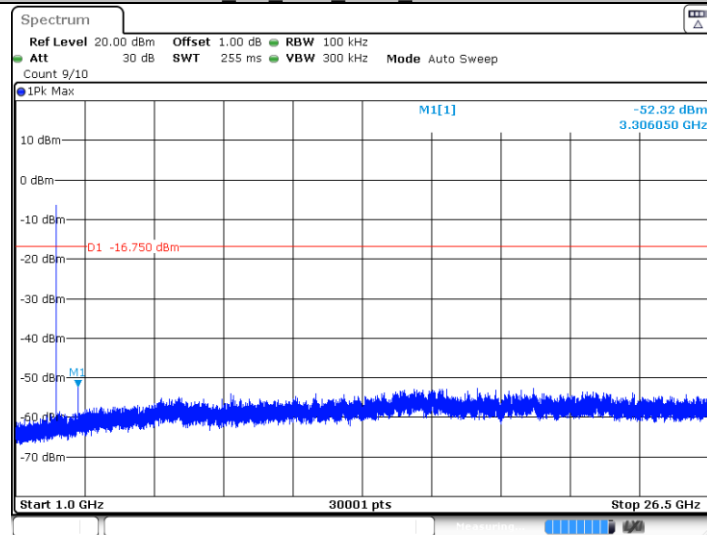


BLE 2M Ant0 2480 30~1000



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BLE 2M Ant0 2480 1000~26500



Date: 13.MAY.2022 16:36:34

9.6 Band Edge

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency
6. Set to the maximum power setting and enable the EUT hopping mode, repeat the test.

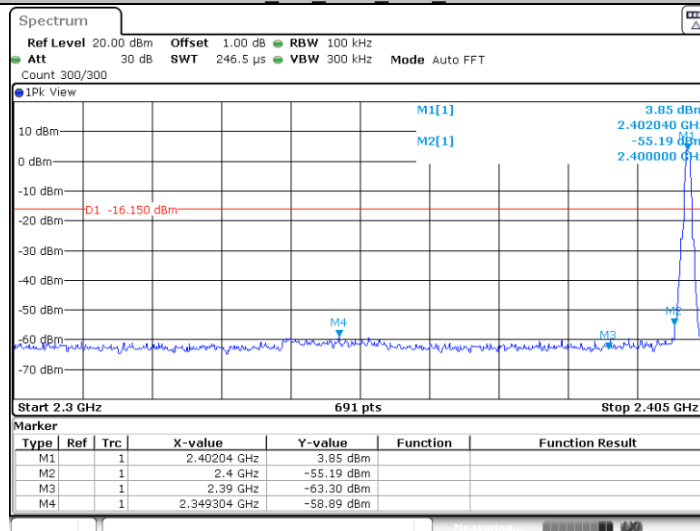
Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

Band edge testing

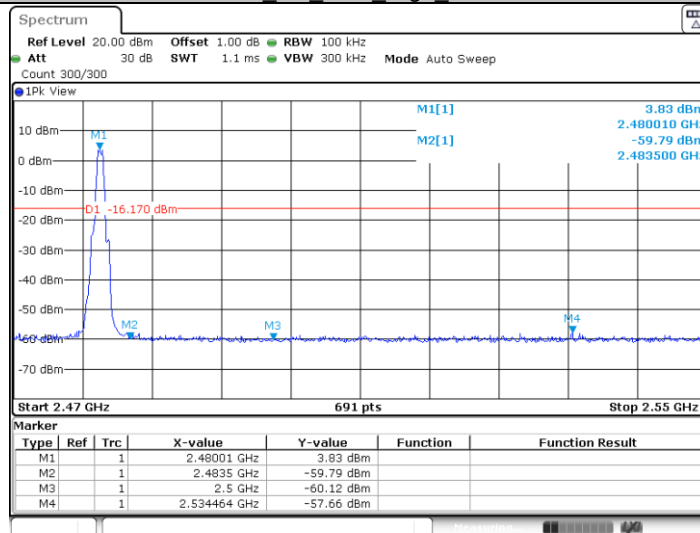
Test Mode	Antenna	Channel	Channel (MHz)	Reference Level (dBm)	Result (dBm)	Limit (dBm)	Verdict
BLE_1M	Ant0	Low	2402	3.85	-58.89	<=-16.15	PASS
		High	2480	3.83	-57.66	<=-16.17	PASS
BLE_2M	Ant0	Low	2402	1.02	-43.62	<=-18.98	PASS
		High	2480	3.41	-53.96	<=-16.59	PASS

BLE_1M_Ant0_Low_2402



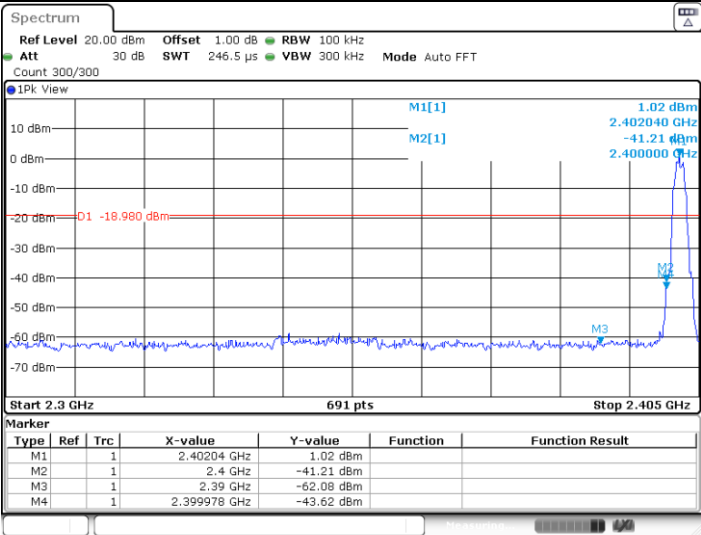
Date: 13 MAY 2022 16:11:29

BLE_1M_Ant0_High_2480



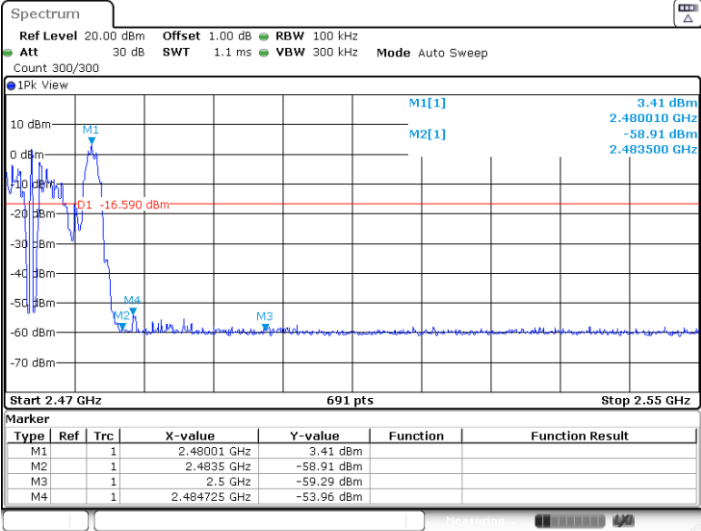
Date: 13 MAY 2022 16:24:03

BLE_2M_Ant0_Low_2402



Date: 13.MAY.2022 16:28:22

BLE 1M_Ant0_High_2480



Date: 13.MAY.2022 16:36:15

9.7 Spurious Radiated Emissions for Transmitter

Test Method

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
4. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
5. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
6. Use the following spectrum analyzer settings According to C63.10:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz, VBW= 300kHz for $f < 1$ GHz; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW=1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.For average measurement:
VBW = 10 Hz, when duty cycle is no less than 98 percent.
VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
7. Repeat above procedures until all frequencies measured were complete.

Note:

- 1: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
- 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($20\log(1/\text{duty cycle})$).
- 4: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

Spurious radiated emissions for transmitter

Limit

The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section 15.205 & RSS-GEN 8.10, must comply with the radiated emission limits specified in section 15.209 & RSS-Gen 6.13.

Frequency MHz	Field Strength $\mu\text{V/m}$	Field Strength $\text{dB}\mu\text{V/m}$	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

BLE_1M of Low channel 2402MHz Test Result

Frequency Band	Frequency MHz	Emission Level dBμV/m	Polarization	Limit dBμV/m	Detector	Margin dBμV/m	Correct factor (dB/m)	Result
30-1000MHz	45.142778	21.29	H	40.00	QP	18.71	20.41	Pass
	49.723333	21.33	H	40.00	QP	18.67	20.70	Pass
	72.733889	20.60	H	40.00	QP	19.40	15.98	Pass
	111.426111	20.45	H	43.50	QP	23.05	18.26	Pass
	346.220000	28.87	H	46.00	QP	17.13	22.76	Pass
	836.285556	35.12	H	46.00	QP	10.88	29.96	Pass
	Other Frequencies	--	H	--	QP	--	--	Pass
	30.000000	32.21	V	40.00	QP	7.79	17.38	Pass
	36.897778	24.74	V	40.00	QP	15.26	18.18	Pass
	67.345000	28.09	V	40.00	QP	11.91	17.90	Pass
	77.098889	29.90		40.00		10.10	14.37	Pass
	84.805000	27.93		40.00		12.07	14.77	Pass
	123.497222	28.08	V	43.50	QP	15.42	16.20	Pass
	Other Frequencies	--	V	--	QP	--	--	Pass
1000-2500MHz	*2256.500000	42.17	H	74	PK	31.83	-5.90	Pass
	3181.500000	45.70	H	74	PK	28.30	-0.76	Pass
	*4274.000000	47.59	H	74	PK	26.41	3.30	Pass
	5672.500000	49.80	H	74	PK	24.20	5.81	Pass
	*9450.000000	45.02	H	74	PK	28.98	13.81	Pass
	17102.500000	50.85	H	74	PK	23.15	22.67	Pass
	Other Frequencies	--	H	--	PK	--	--	Pass
	*2293.500000	44.14	V	74	PK	29.86	-5.76	Pass
	2554.500000	46.00	V	74	PK	28.00	-4.41	Pass
	*5369.000000	50.76	V	74	PK	23.24	5.42	Pass
	6383.000000	49.01	V	74	PK	24.99	8.32	Pass
	*12633.000000	47.15	V	74	PK	26.85	15.39	Pass
	*17944.500000	51.45	V	74	PK	22.55	22.54	Pass
	Other Frequencies	--	V	--	PK	--	--	Pass

Remark:

- (1) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205 & RSS-GEN 8.10.
- (2) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) We test both rates for Low channel, Middle channel and High channel separately, only the worse case recorded in this report.
- (4) Corrected Amplitude = Read level + Corrector factor
 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
 Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
 (The Reading Level is recorded by software which is not shown in the sheet)

10 Test Equipment List

List of Test Instruments

Radiated Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	68-4-74-14-002	101269	1	2022-6-4
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9162	68-4-80-19-003	284	1	2023-1-17
Wave Guide Antenna	ETS	3117	68-4-80-19-001	00218954	1	2022-5-24
Pre-amplifier	Rohde & Schwarz	SCU 18F	68-4-29-19-001	100745	1	2022-10-10
Pre-amplifier	Rohde & Schwarz	SCU 18F	68-4-29-19-002	100746	1	2022-10-10
Sideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	68-4-80-14-008	12827	1	2022-7-21
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	100432	1	2022-7-27
Attenuator	Mini-circuits	UNAT-6+	68-4-81-21-002	15542	1	2022-8-23
3m Semi-anechoic chamber	TDK	SAC-3 #2	68-4-90-19-006	----	2	2023-5-28
Test software	Rohde & Schwarz	EMC32	68-4-90-19-006-A01	Version10.35.0 2	N/A	N/A

Conducted Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-14-001	101782	1	2022-6-4
LISN	Rohde & Schwarz	ENV4200	68-4-87-14-001	100249	1	2022-6-5
LISN	Rohde & Schwarz	ENV432	68-4-87-16-001	101318	1	2022-6-5
LISN	Rohde & Schwarz	ENV216	68-4-87-14-002	100326	1	2022-6-5
ISN	Rohde & Schwarz	ENY81	68-4-87-14-003	100177	1	2022-6-5
ISN	Rohde & Schwarz	ENY81-CA6	68-4-87-14-004	101664	1	2022-6-5
High Voltage Probe	Schwarzbeck	TK9420(VT9420)	68-4-27-14-001	9420-584	1	2022-6-5
RF Current Probe	Rohde & Schwarz	EZ-17	68-4-27-14-002	100816	1	2022-6-5
Attenuator	Shanghai Huaxiang	TS2-26-3	68-4-81-16-003	080928189	1	2022-6-3
Test software	Rohde & Schwarz	EMC32	68-4-90-14-003-A10	Version9.15.0 0	N/A	N/A
Shielding Room	TDK	CSR #1	68-4-90-19-004	----	3	2022-11-07

Conducted RF Test System

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-004	101030	1	2022-6-3
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	68-4-93-14-003	101226/100851	1	2022-6-3
Power Splitter	Weinschel	1580	68-4-85-14-001	SC319	1	2022-6-3
Test software	Tonscend	System for BT/WIFI	68-4-74-14-006-A13	Version 2.6.77.0518	N/A	N/A
Shielding Room	TDK	TS8997	68-4-90-19-003	----	3	2022-11-07

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV432 or ENV4200)	3.31dB
Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) 30MHz-1000MHz	Horizontal: 4.67dB; Vertical: 4.65dB;
Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) 1000MHz-18000MHz	Horizontal: 4.76dB; Vertical: 4.75dB;
Uncertainty for Radiated Emission 18000MHz-40000MHz	Horizontal: 4.51dB; Vertical: 4.50dB;
Uncertainty for Conducted RF test	RF Power Conducted: 1.27dB Frequency test involved: 0.6×10^{-7} or 1%

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.

THE END