9.4 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz,VBW≥3RBW,Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
3. Repeat above procedures until other frequencies measured were completed.

Limit

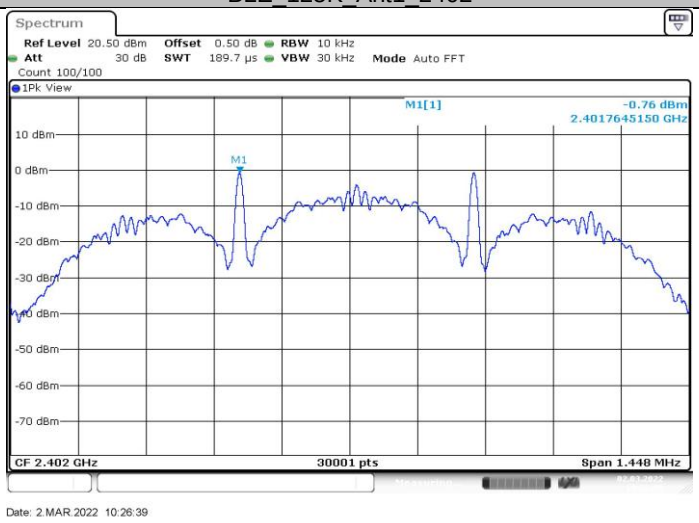
Limit [dBm/3kHz]
≤8

Test result

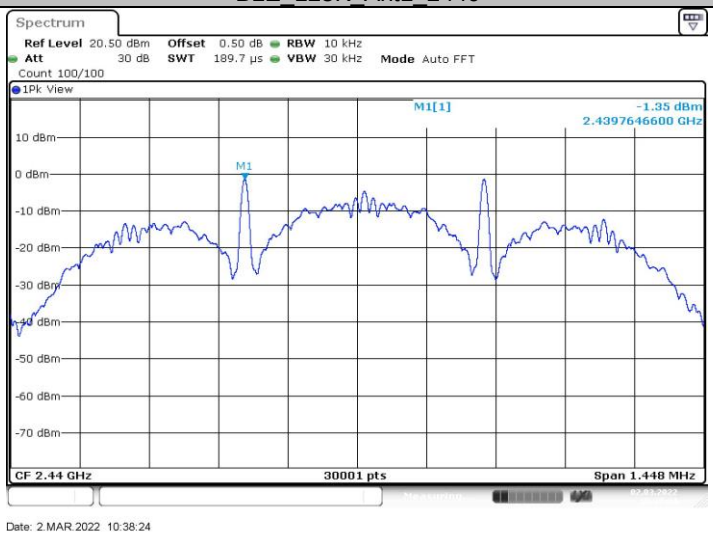
Test Mode	Frequency **MHz**	Power spectral density **dBm/10kHz**	Result
BLE_125K	2405MHz	-0.76	Pass
	2440MHz	-1.35	Pass
	2480MHz	-1.88	Pass
BLE_1M	2405MHz	-5.39	Pass
	2440MHz	-5.92	Pass
	2480MHz	-6.38	Pass
BLE_2M	2405MHz	-8.87	Pass
	2440MHz	-9.41	Pass
	2480MHz	-9.87	Pass
BLE_500K	2405MHz	-6.18	Pass
	2440MHz	-6.76	Pass
	2480MHz	-7.23	Pass

Power spectral density

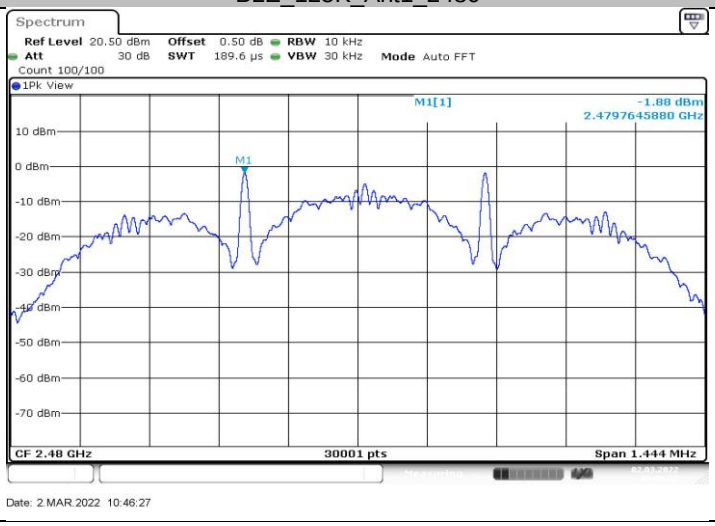
BLE_125K_Ant1_2402



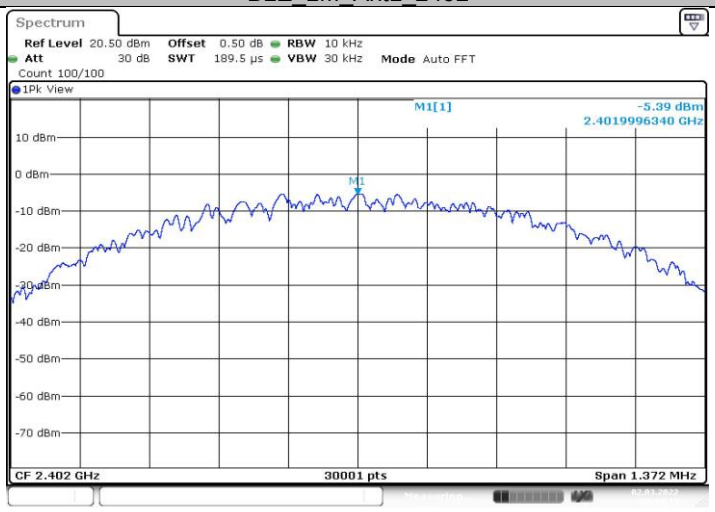
BLE_125K_Ant1_2440



BLE_125K_Ant1_2480

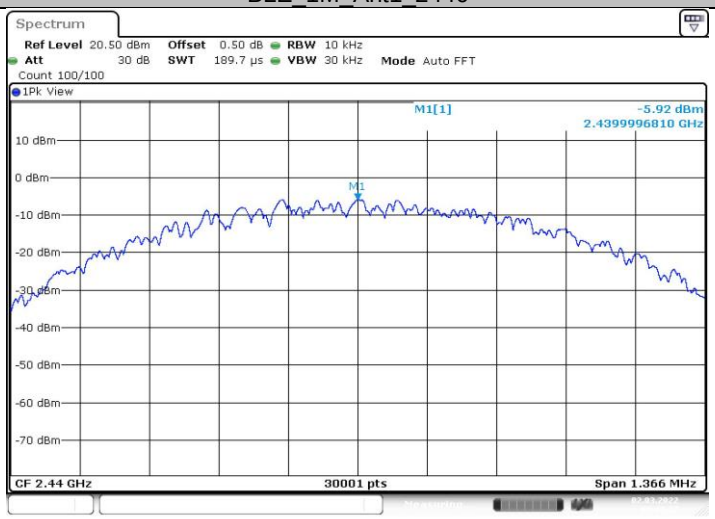


BLE_1M_Ant1_2402



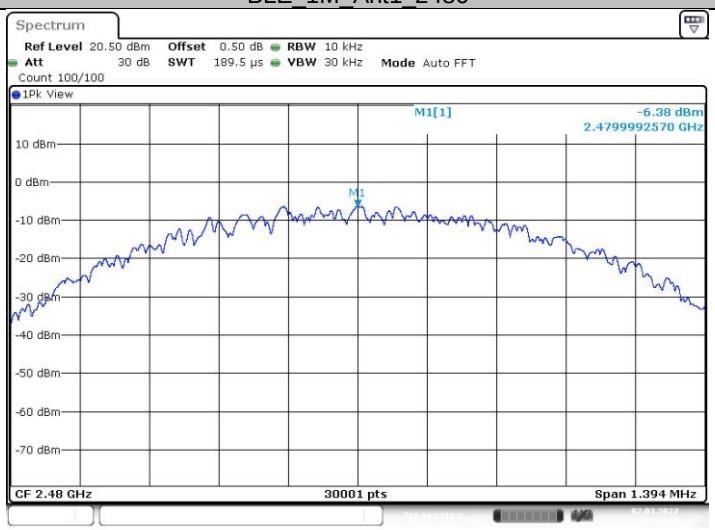
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BLE_1M_Ant1_2440



Date: 2.MAR.2022 09:43:27

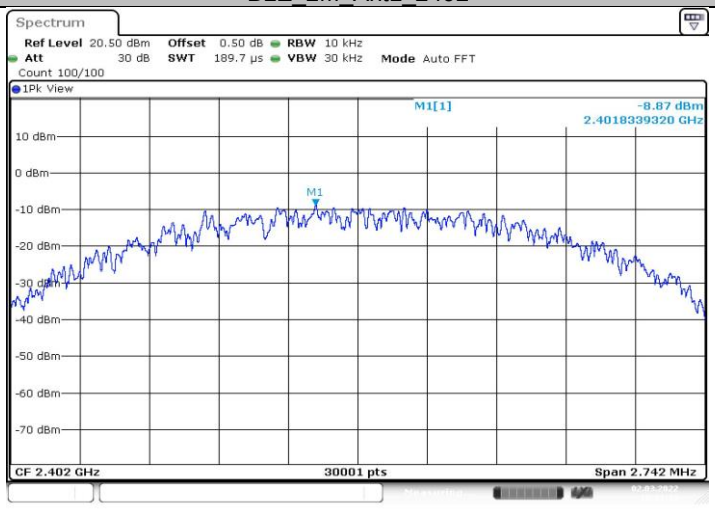
BLE_1M_Ant1_2480



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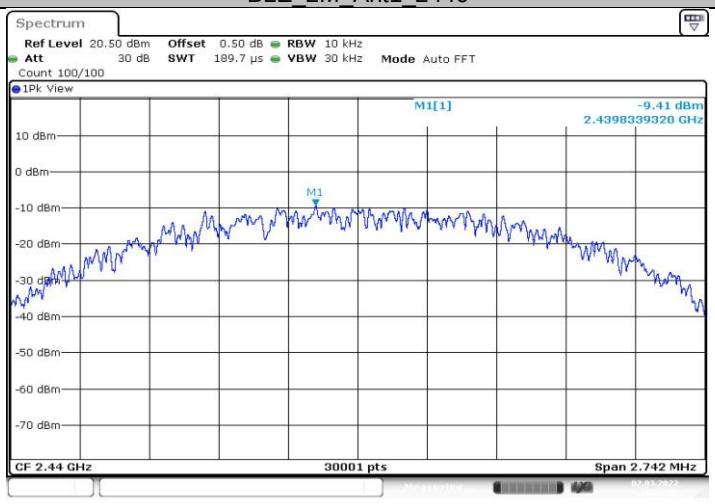
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Phone: +86 21 61410123, Fax:+86 21 61408600

BLE_2M_Ant1_2402



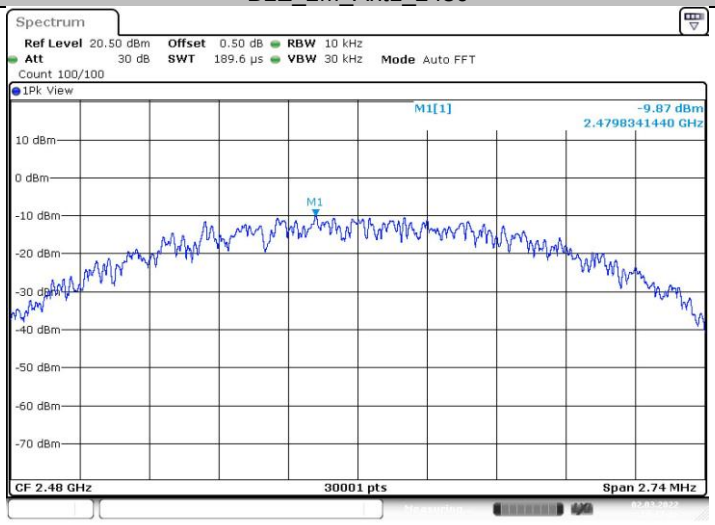
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BLE_2M_Ant1_2440



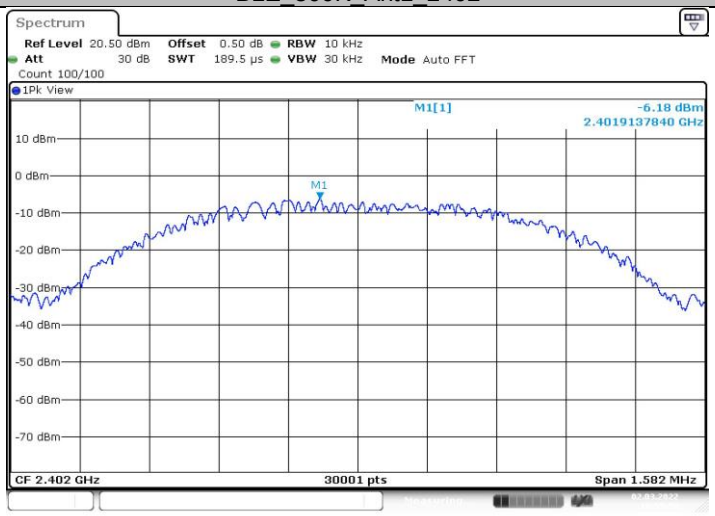
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BLE_2M_Ant1_2480



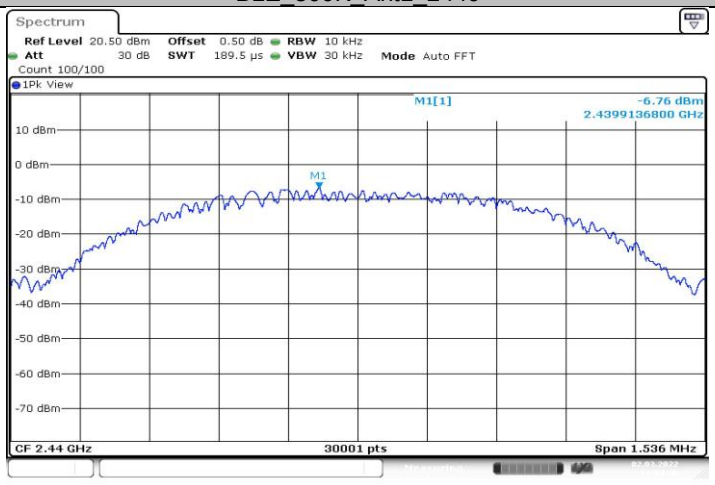
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BLE_500K_Ant1_2402



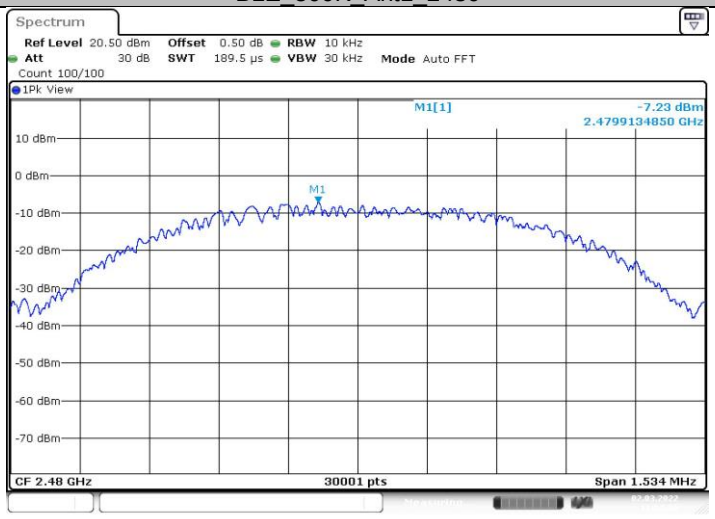
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BLE_500K_Ant1_2440



Date: 2.MAR.2022 11:04:48

BLE_500K_Ant1_2480



Date: 2.MAR.2022 11:54:05

9.5 Spurious RF conducted emissions

Test Method

1. Establish a reference level by using the following procedure:
   a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
   b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
2. Use the maximum PSD level to establish the reference level.
   a. Set the center frequency and span to encompass frequency range to be measured.
   b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
3. Repeat above procedures until other frequencies measured were completed.

Limit

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

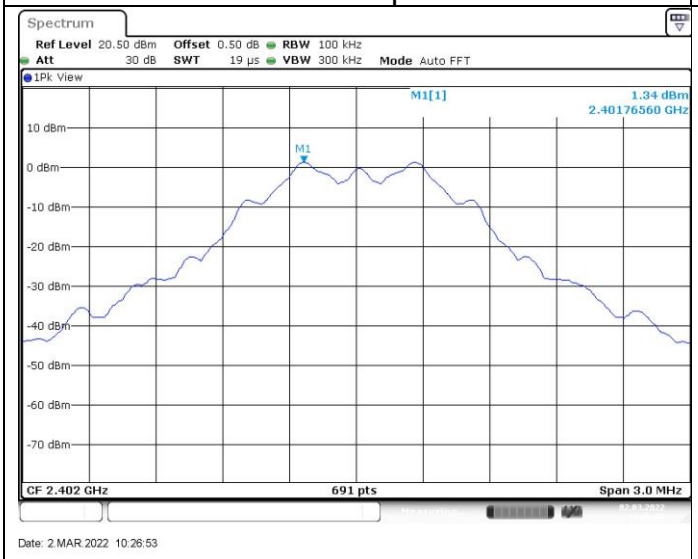
Spurious RF conducted emissions

BLE_125K

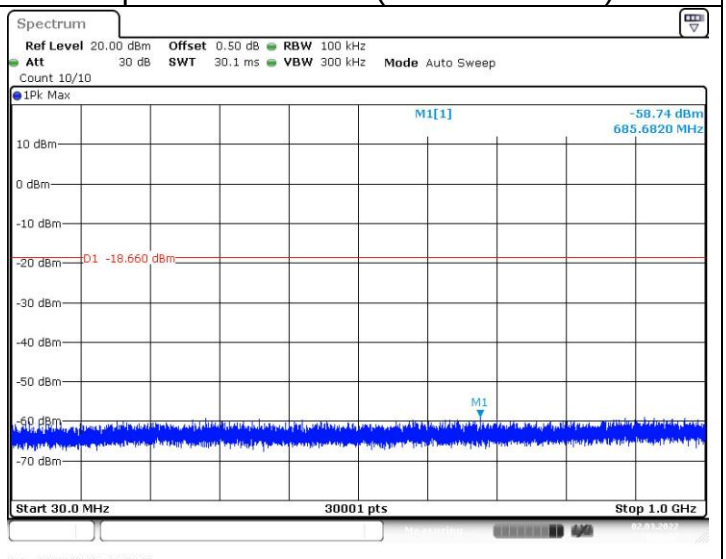
Out-of-Band Emissions

Channel 0 (2402MHz)

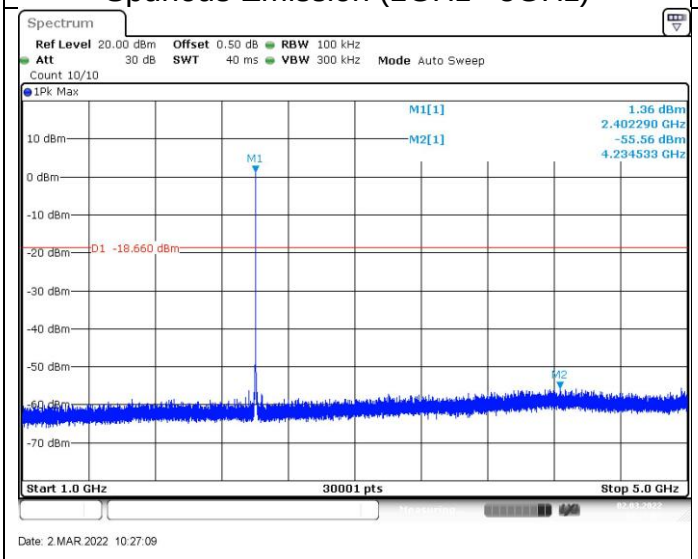
Reference point



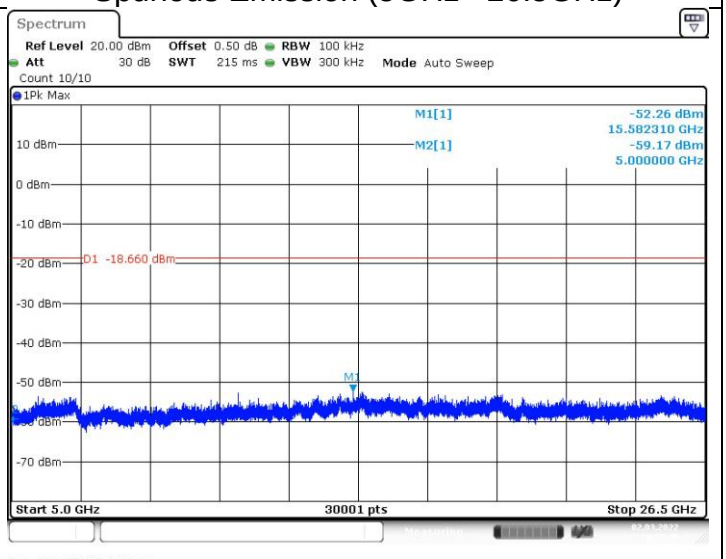
Spurious Emission (30MHz – 1GHz)

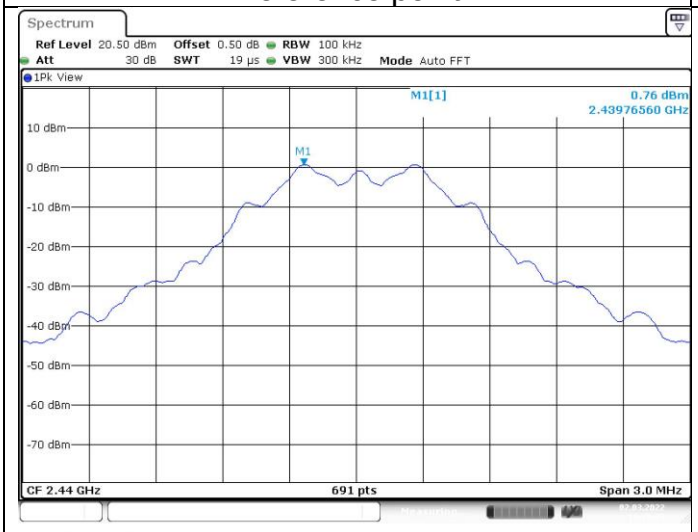
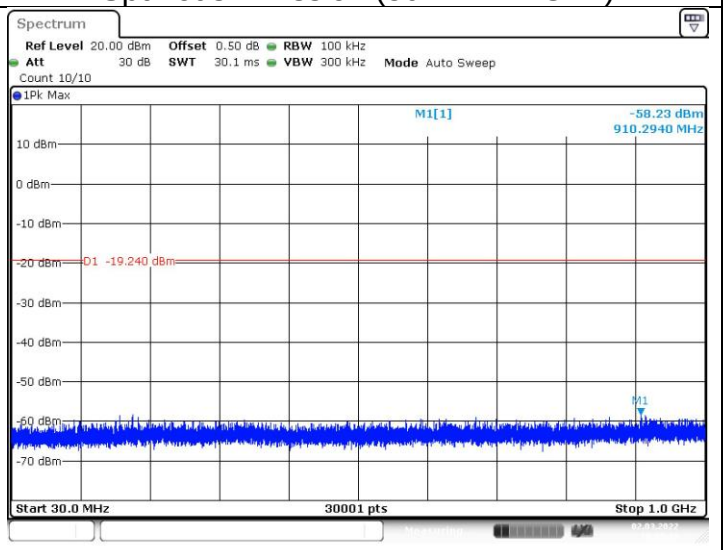
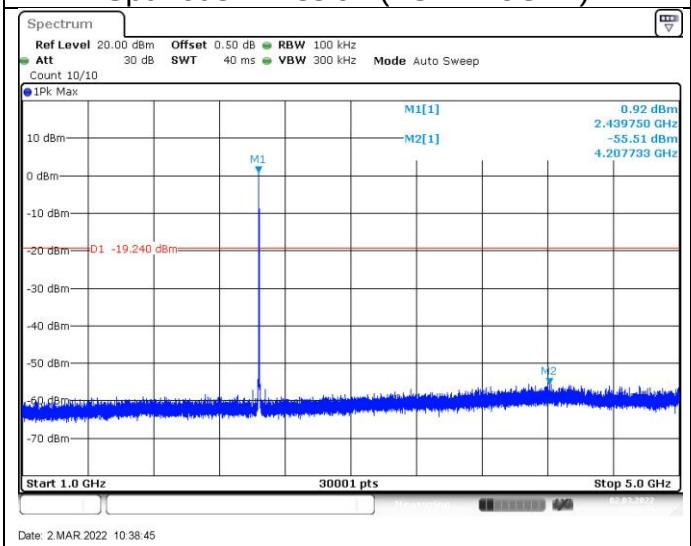
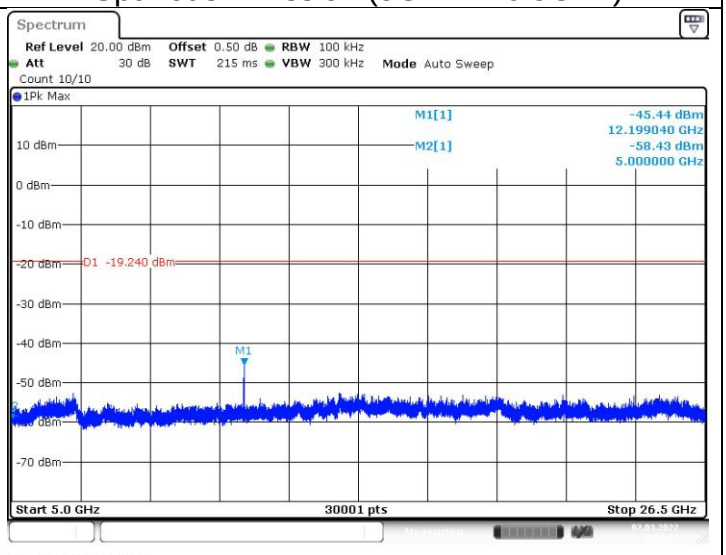


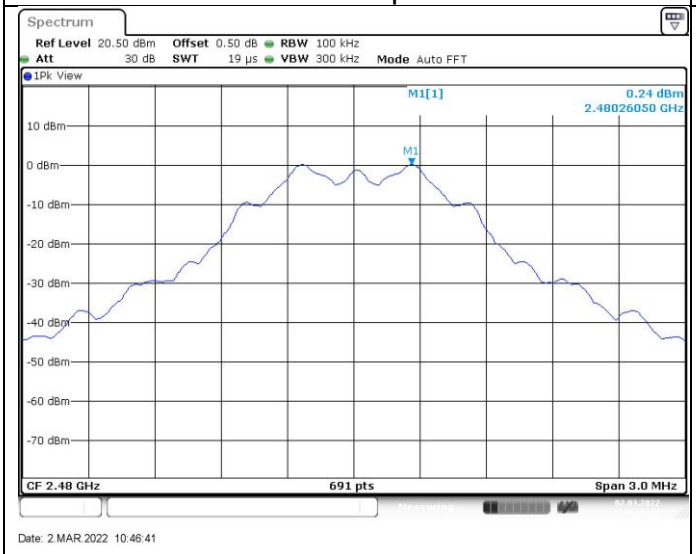
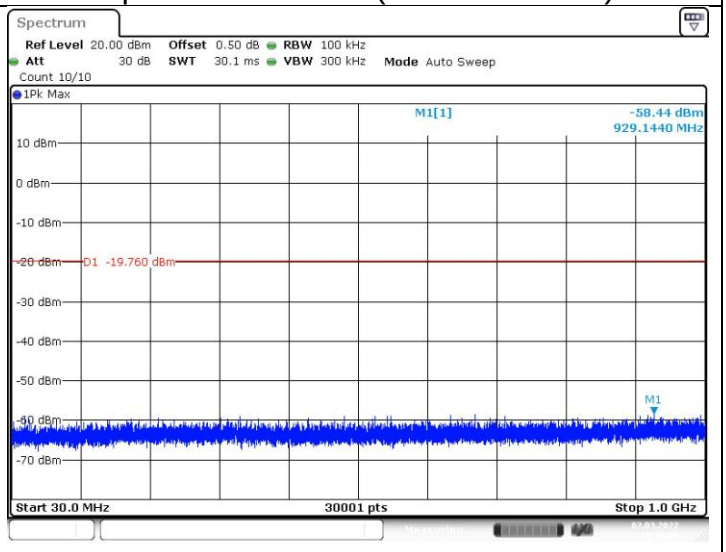
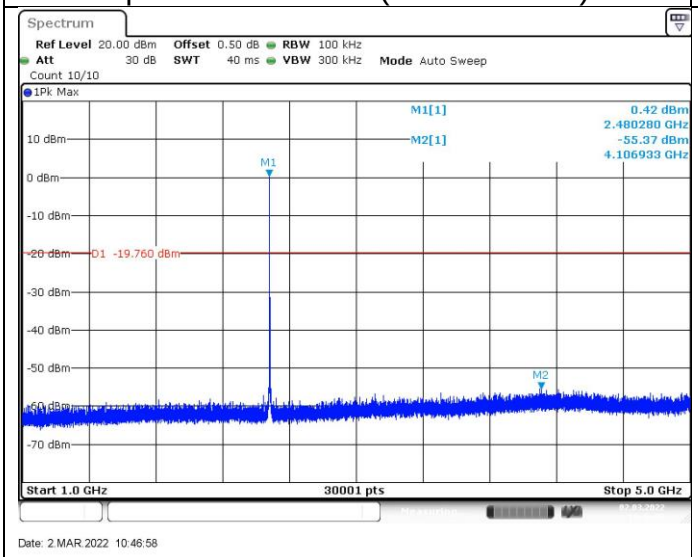
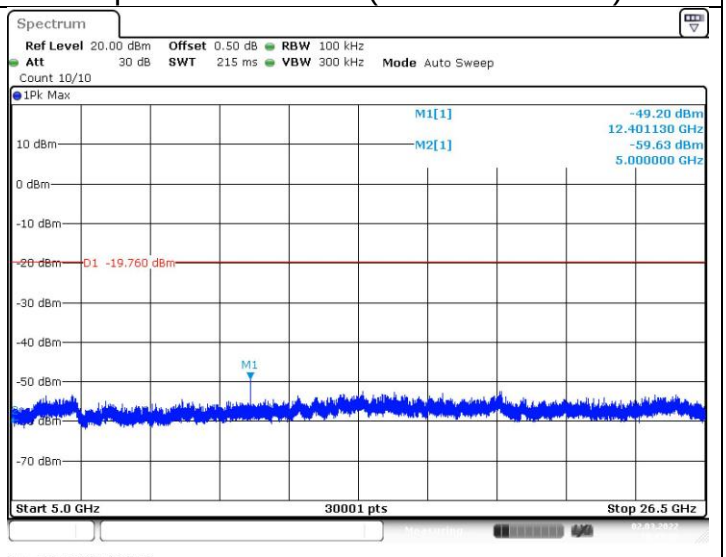
Spurious Emission (1GHz –5GHz)



Spurious Emission (5GHz –26.5GHz)



Out-of-Band Emissions	
Channel 19 (2440MHz)	
Reference point	Spurious Emission (30MHz – 1GHz)
	
Spurious Emission (1GHz –5GHz)	Spurious Emission (5GHz –26.5GHz)
	

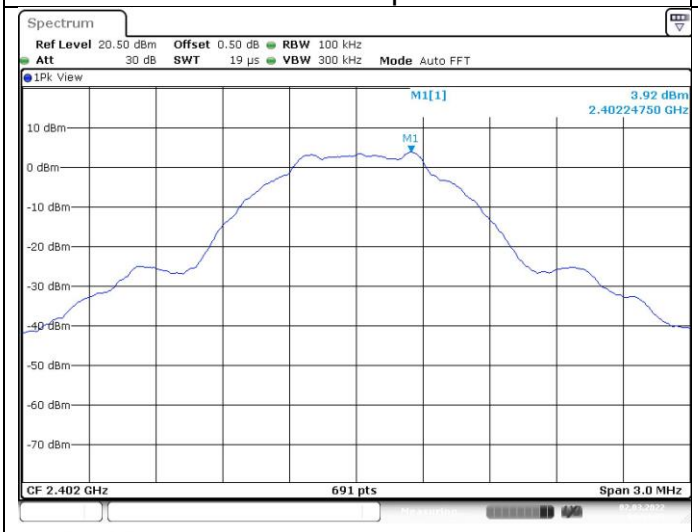
Out-of-Band Emissions	
Channel 39 (2480MHz)	
Reference point	Spurious Emission (30MHz – 1GHz)
	
Spurious Emission (1GHz –5GHz)	Spurious Emission (5GHz –26.5GHz)
	

BLE_1M

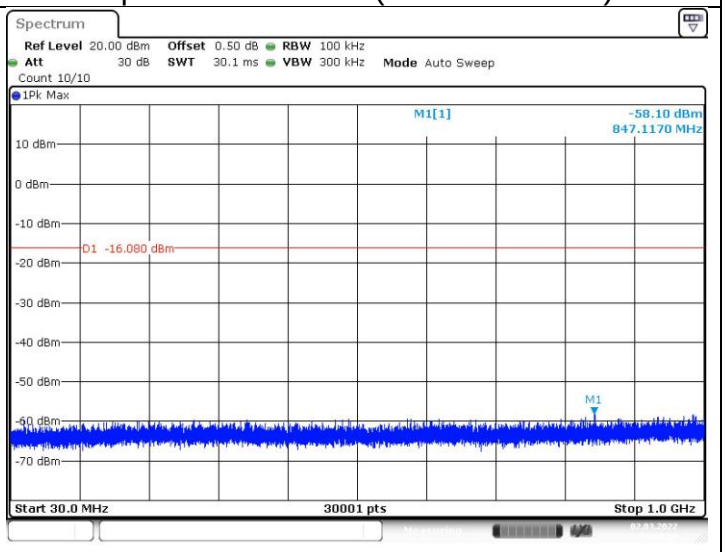
Out-of-Band Emissions

Channel 0 (2402MHz)

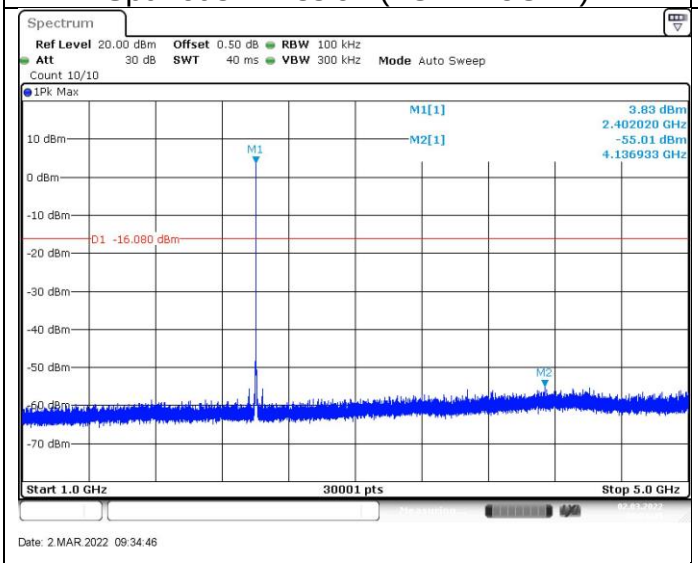
Reference point



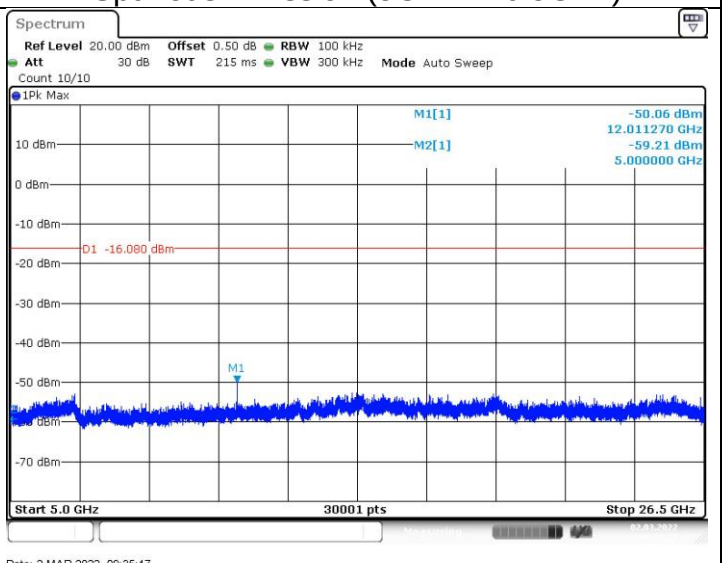
Spurious Emission (30MHz – 1GHz)



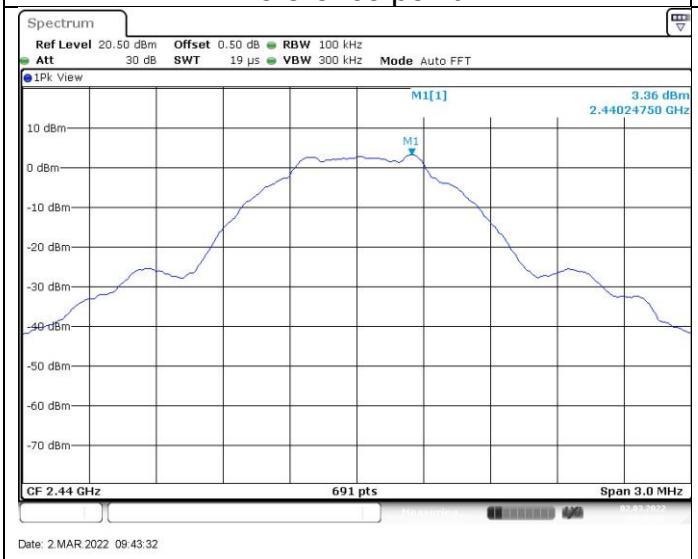
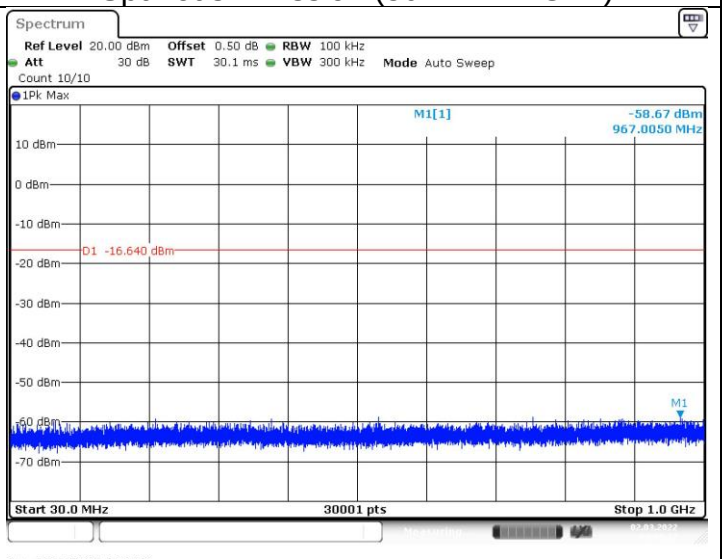
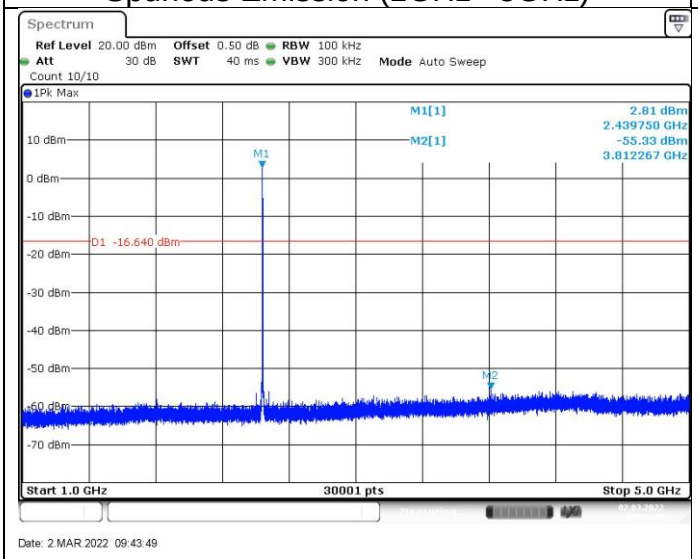
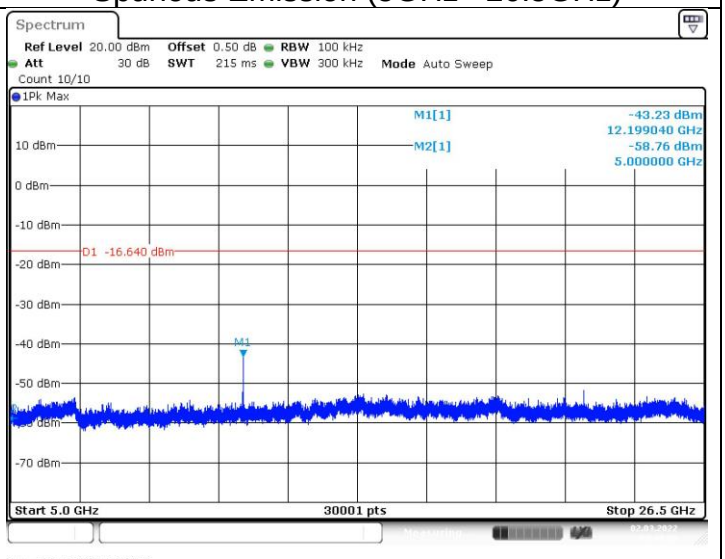
Spurious Emission (1GHz –5GHz)

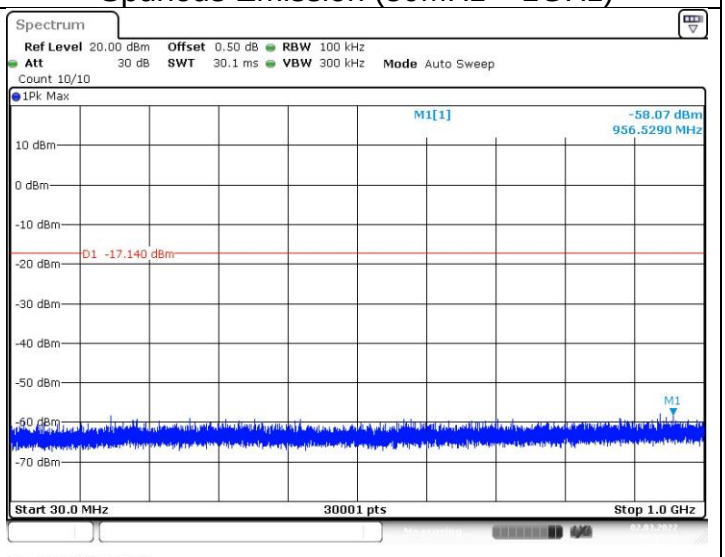
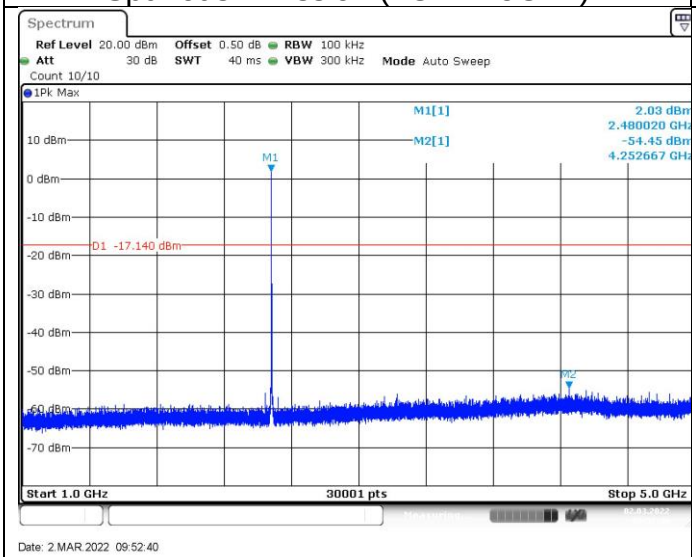
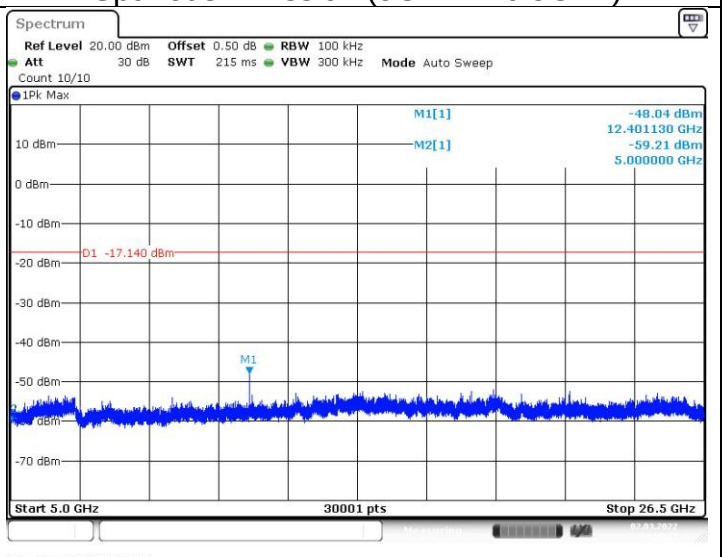


Spurious Emission (5GHz –26.5GHz)



China

Out-of-Band Emissions	
Channel 19 (2440MHz)	
Reference point	Spurious Emission (30MHz – 1GHz)
	
Spurious Emission (1GHz –5GHz)	Spurious Emission (5GHz –26.5GHz)
	

Out-of-Band Emissions	
Channel 39 (2480MHz)	
Reference point	Spurious Emission (30MHz – 1GHz)
	
Spurious Emission (1GHz –5GHz)	Spurious Emission (5GHz –26.5GHz)
	

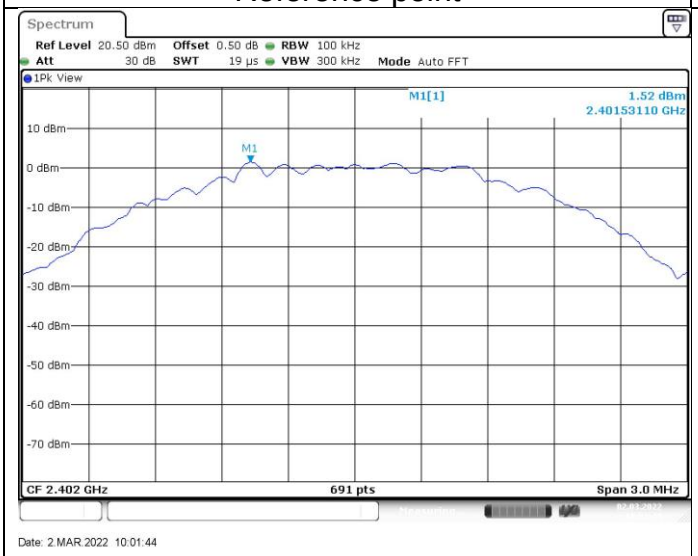
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BLE_2M

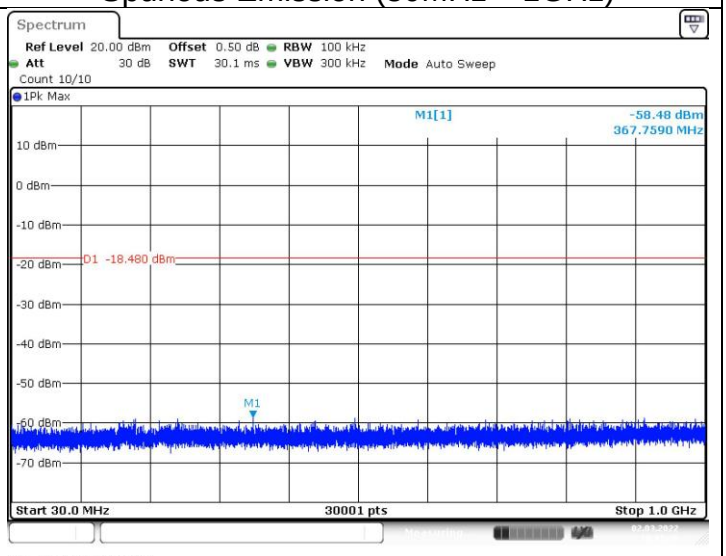
Out-of-Band Emissions

Channel 0 (2402MHz)

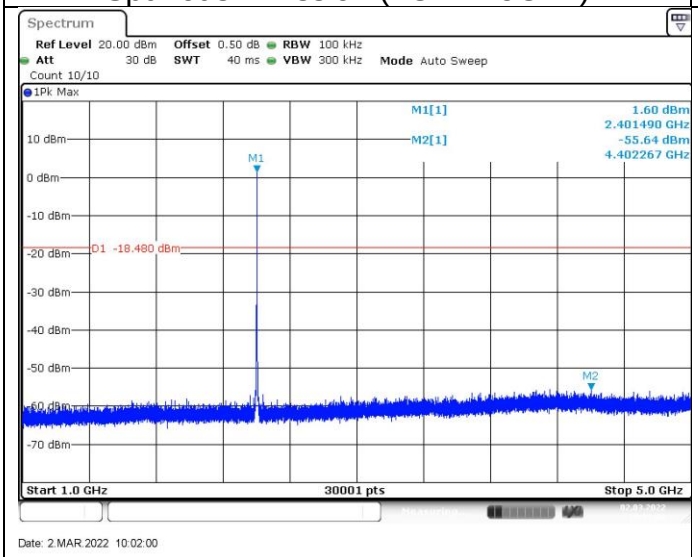
Reference point



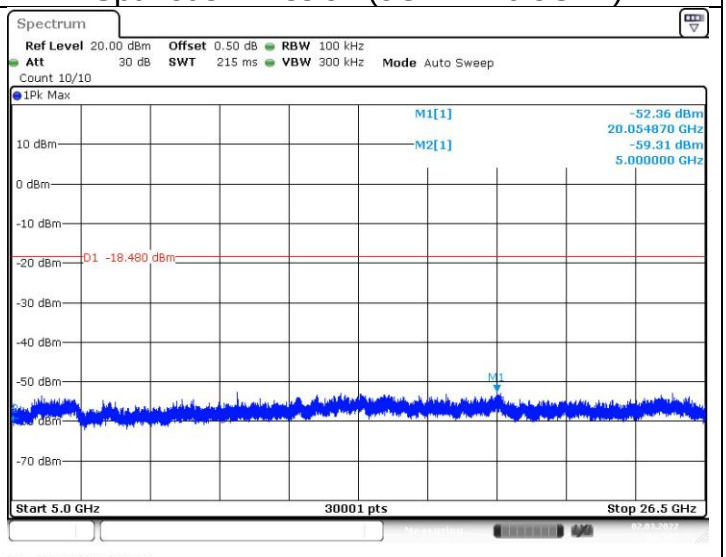
Spurious Emission (30MHz – 1GHz)

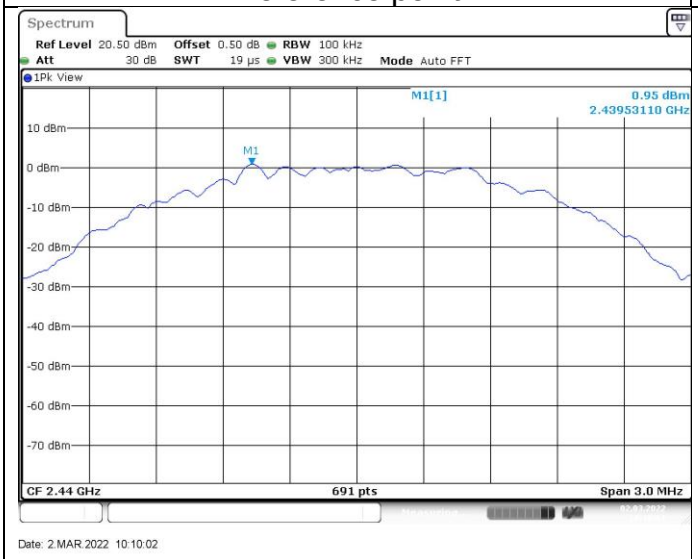
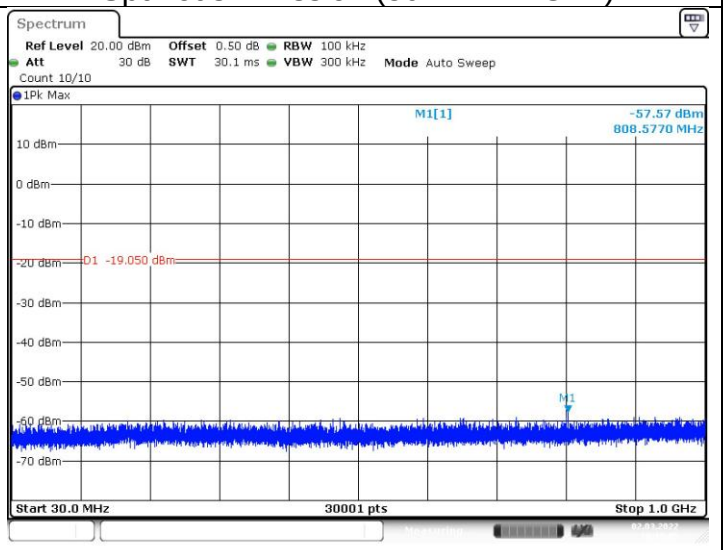
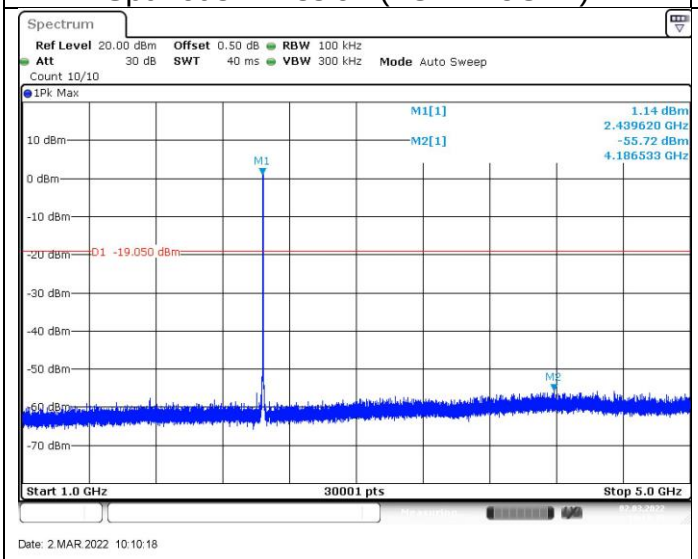
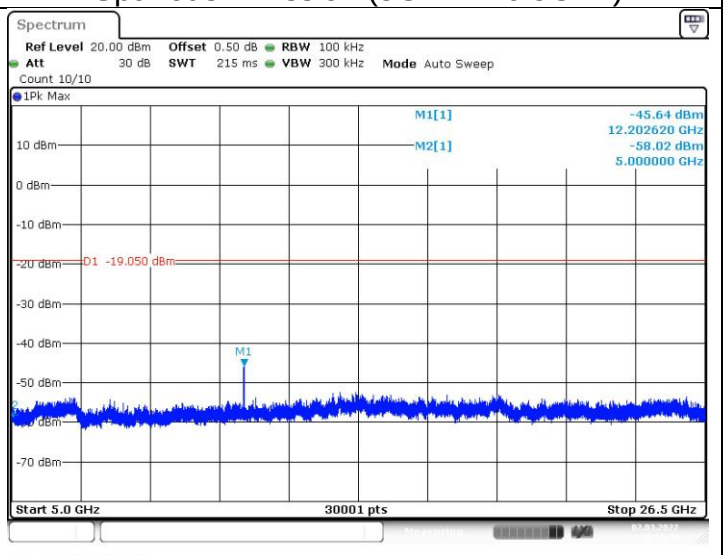


Spurious Emission (1GHz –5GHz)

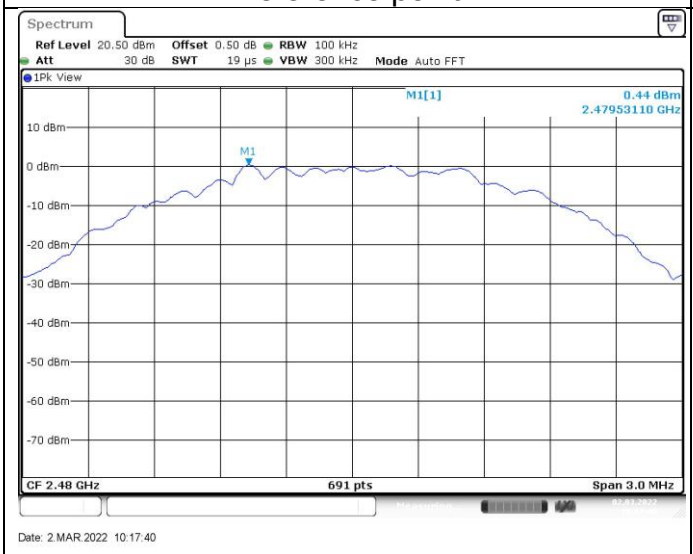
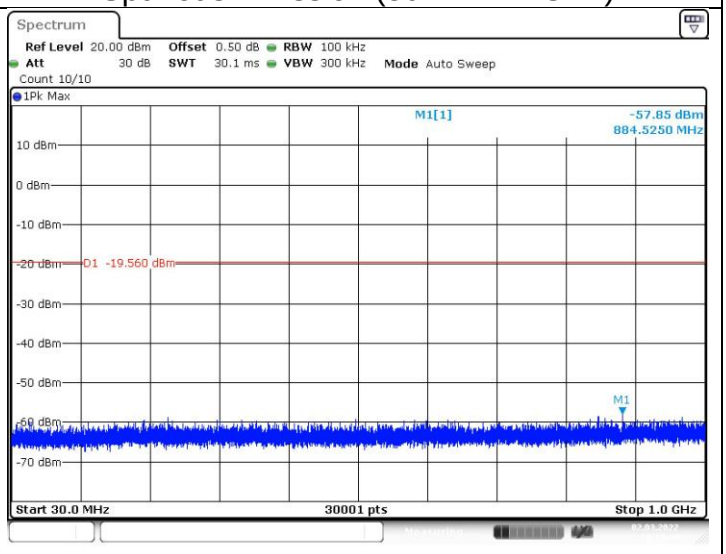
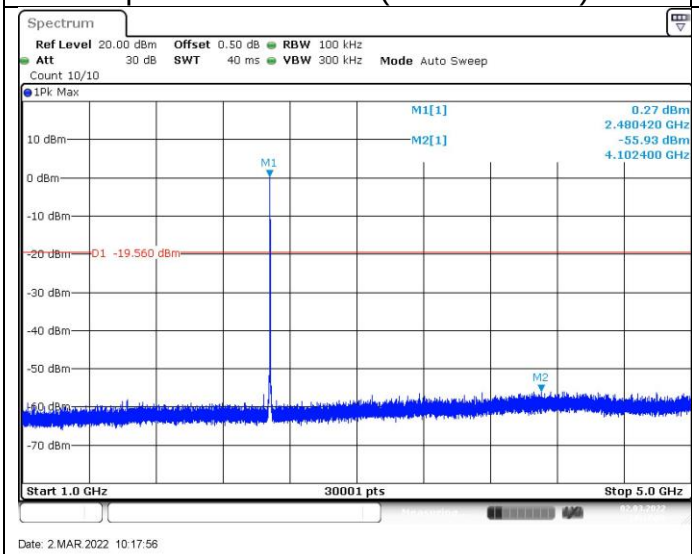
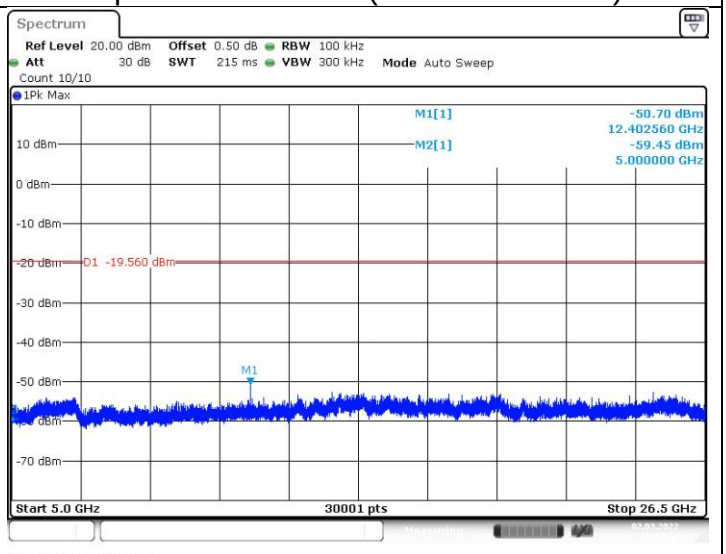


Spurious Emission (5GHz –26.5GHz)



Out-of-Band Emissions	
Channel 19 (2440MHz)	
Reference point	Spurious Emission (30MHz – 1GHz)
	
Spurious Emission (1GHz –5GHz)	Spurious Emission (5GHz –26.5GHz)
	

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Phone: +86 21 61410123, Fax:+86 21 61408600

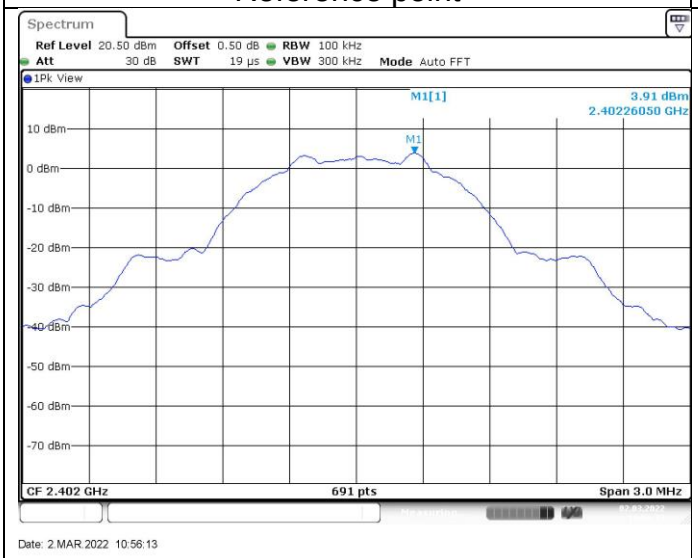
Out-of-Band Emissions	
Channel 39 (2480MHz)	
Reference point	Spurious Emission (30MHz – 1GHz)
	
Spurious Emission (1GHz –5GHz)	Spurious Emission (5GHz –26.5GHz)
	

BLE_500K

Out-of-Band Emissions

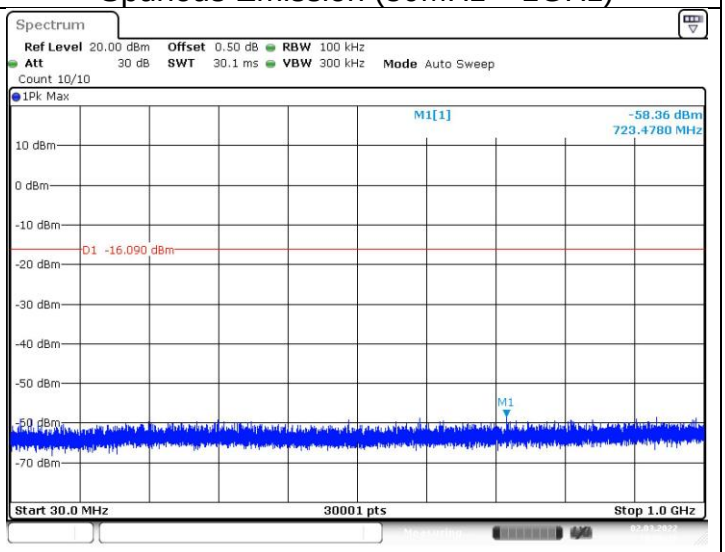
Channel 0 (2402MHz)

Reference point



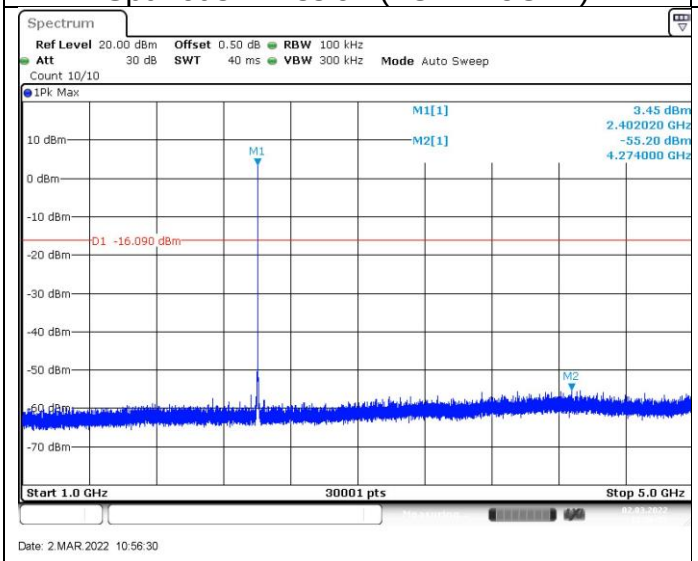
Date: 2.MAR.2022 10:56:13

Spurious Emission (30MHz – 1GHz)



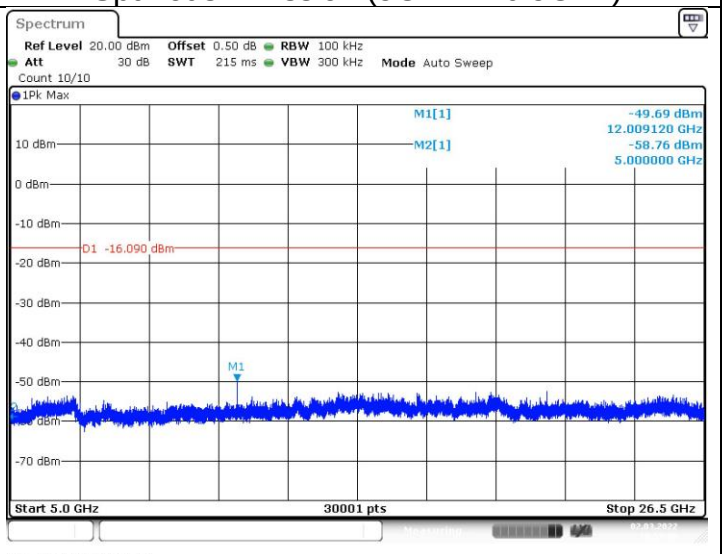
Date: 2.MAR.2022 10:56:18

Spurious Emission (1GHz –5GHz)

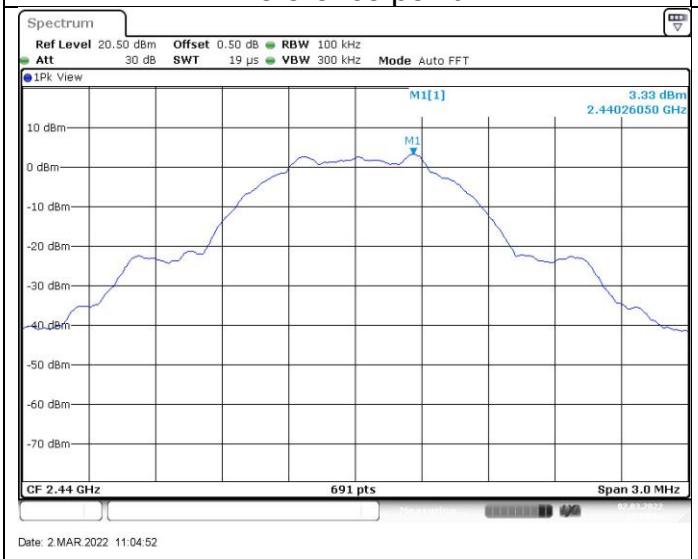
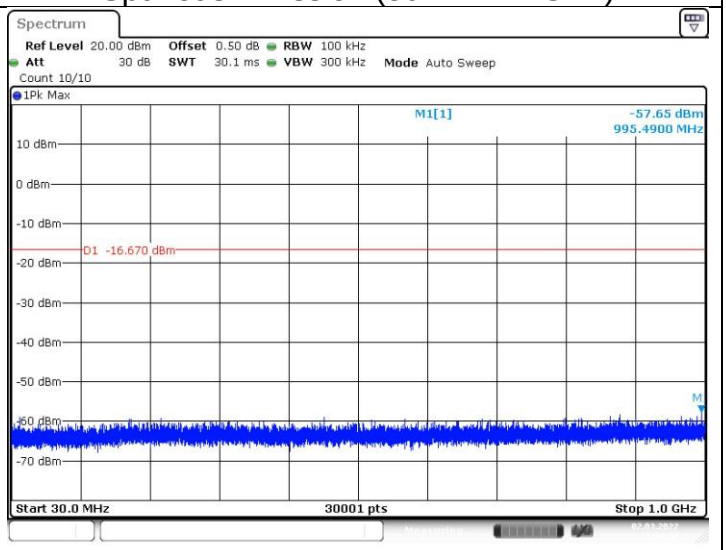
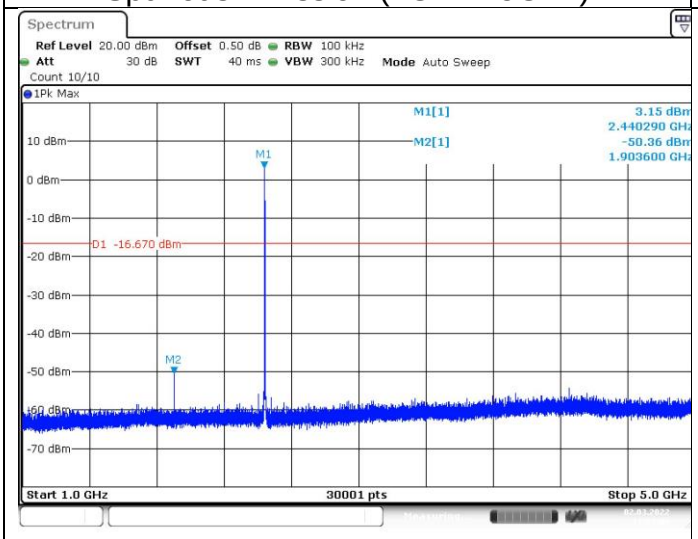
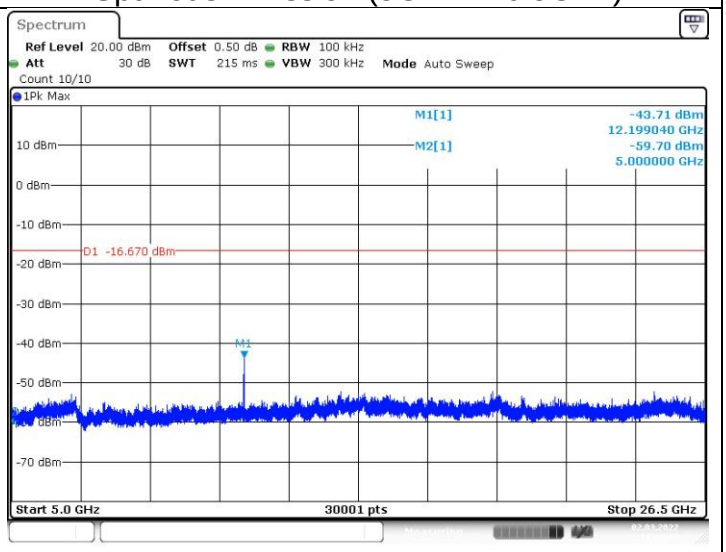


Date: 2.MAR.2022 10:56:30

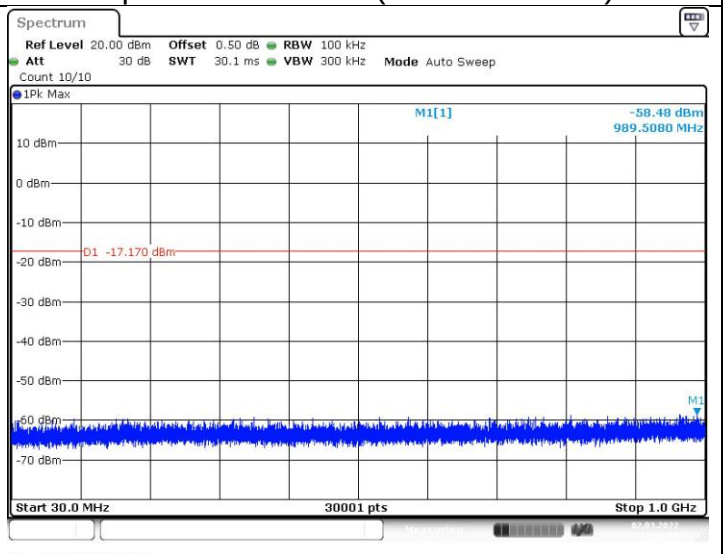
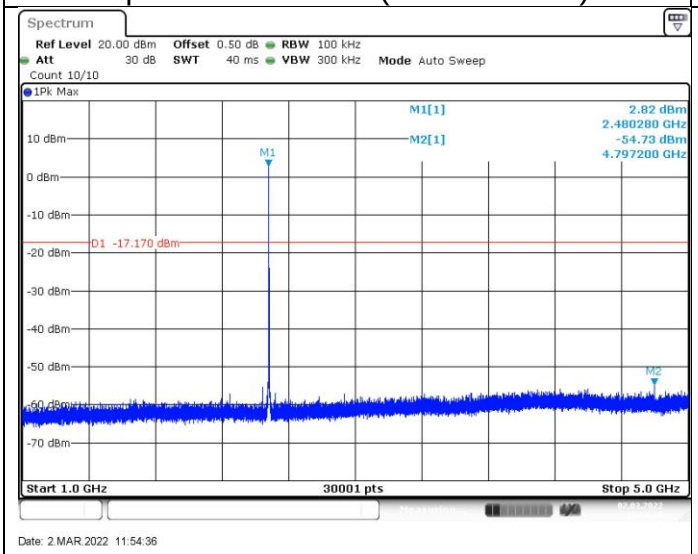
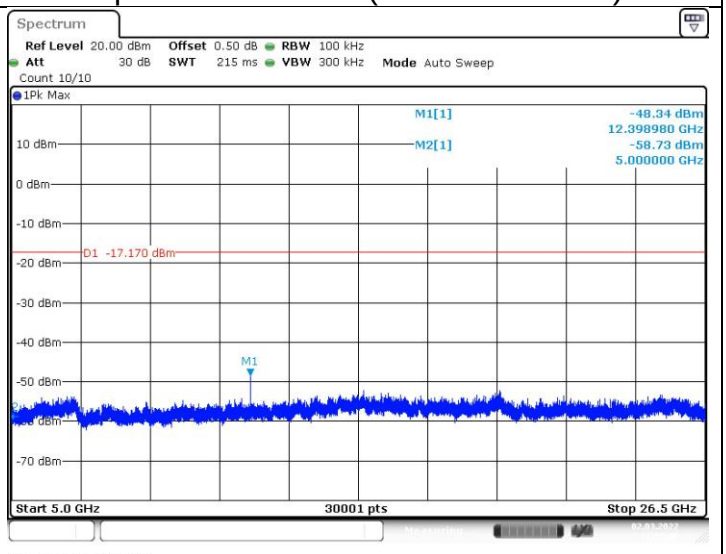
Spurious Emission (5GHz –26.5GHz)



Date: 2.MAR.2022 10:57:01

Out-of-Band Emissions	
Channel 19 (2440MHz)	
Reference point	Spurious Emission (30MHz – 1GHz)
	
Spurious Emission (1GHz –5GHz)	Spurious Emission (5GHz –26.5GHz)
	

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Out-of-Band Emissions	
Channel 39 (2480MHz)	
Reference point	Spurious Emission (30MHz – 1GHz)
	
Spurious Emission (1GHz –5GHz)	Spurious Emission (5GHz –26.5GHz)
	

9.6 Band edge

Test Method

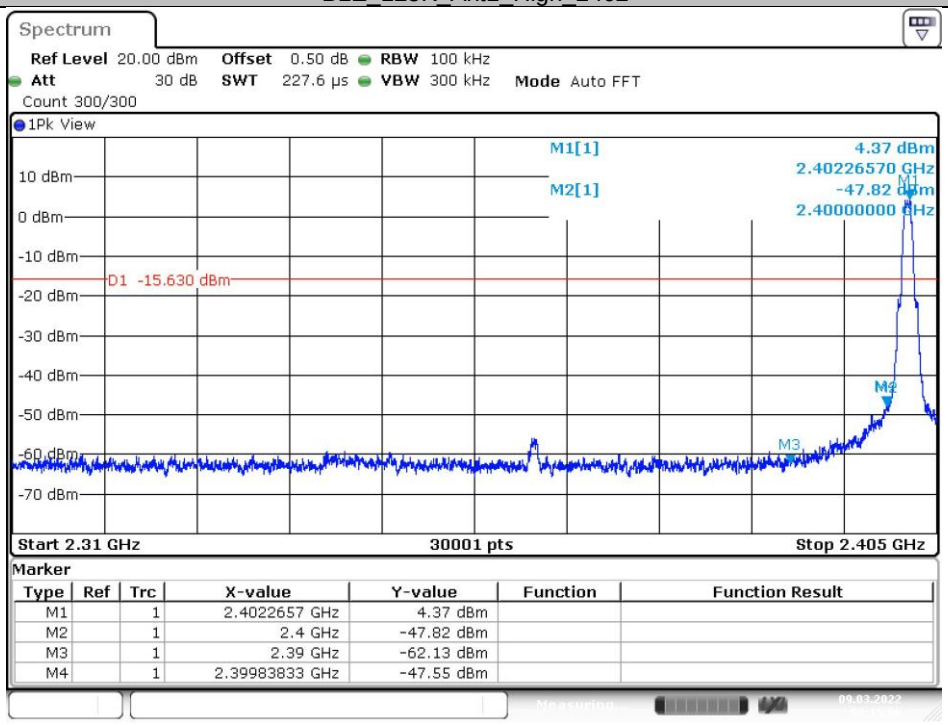
1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold.
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
3 The level displayed must comply with the limit specified in this Section.

Limit

According to §15.247(d) and RSS-247 5.5, in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator 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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) and RSS-Gen 8.10, must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)) and RSS-Gen.

Test result

BLE_125K_Ant1_High_2402

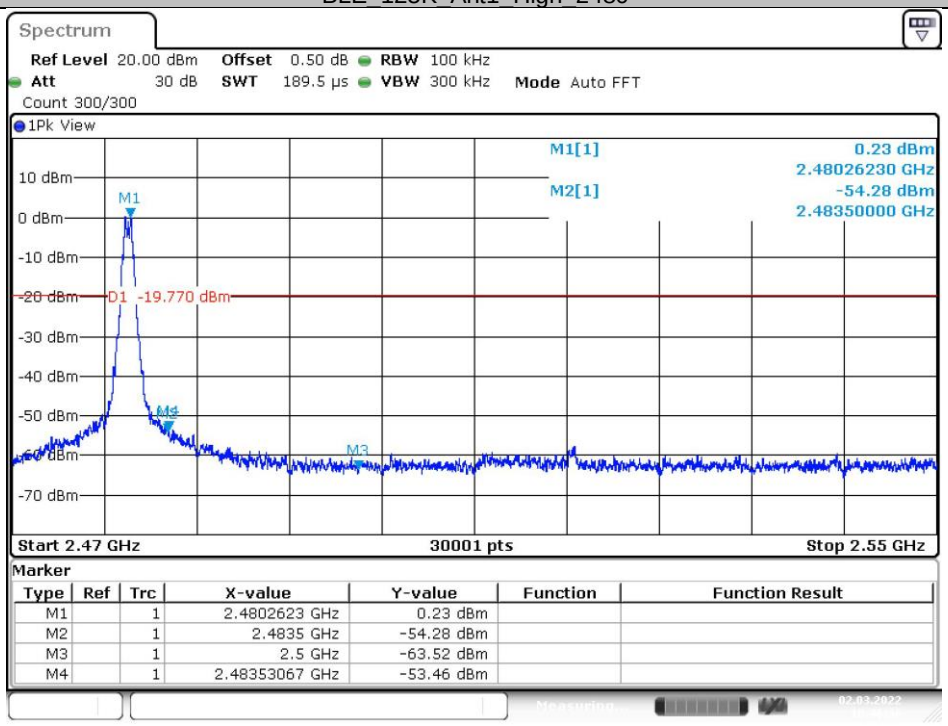


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4022657 GHz	4.37 dBm		
M2		1	2.4 GHz	-47.82 dBm		
M3		1	2.39 GHz	-62.13 dBm		
M4		1	2.39983833 GHz	-47.55 dBm		

Date: 9.MAR.2022 09:15:00

BLE_125K_Ant1_High_2480



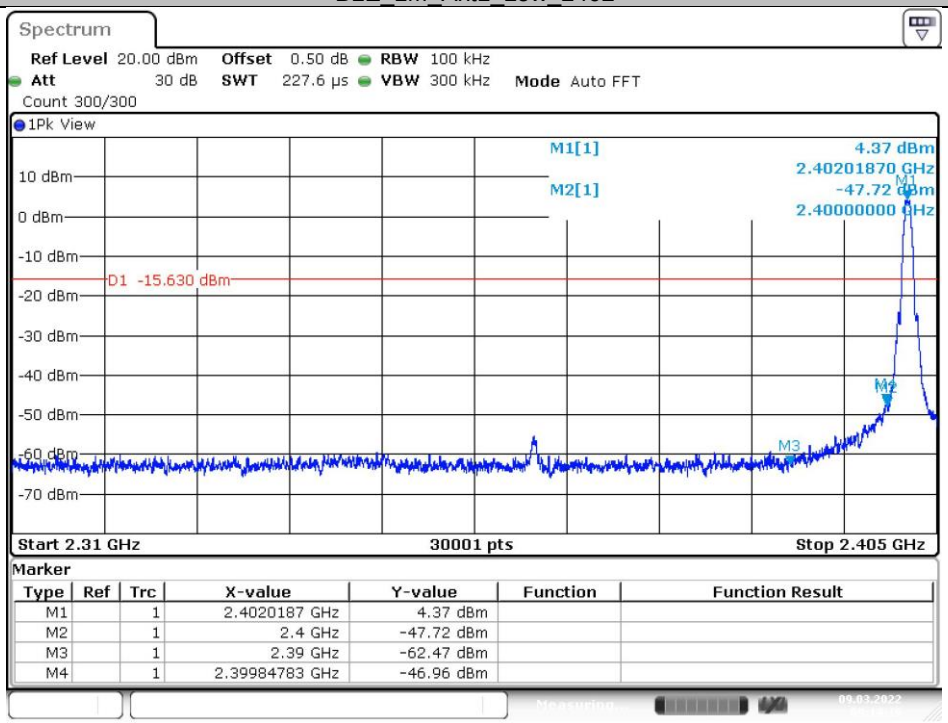
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4802623 GHz	0.23 dBm		
M2		1	2.4835 GHz	-54.28 dBm		
M3		1	2.5 GHz	-63.52 dBm		
M4		1	2.48353067 GHz	-53.46 dBm		

Date: 2.MAR.2022 10:46:36

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BLE_1M_Ant1_Low_2402

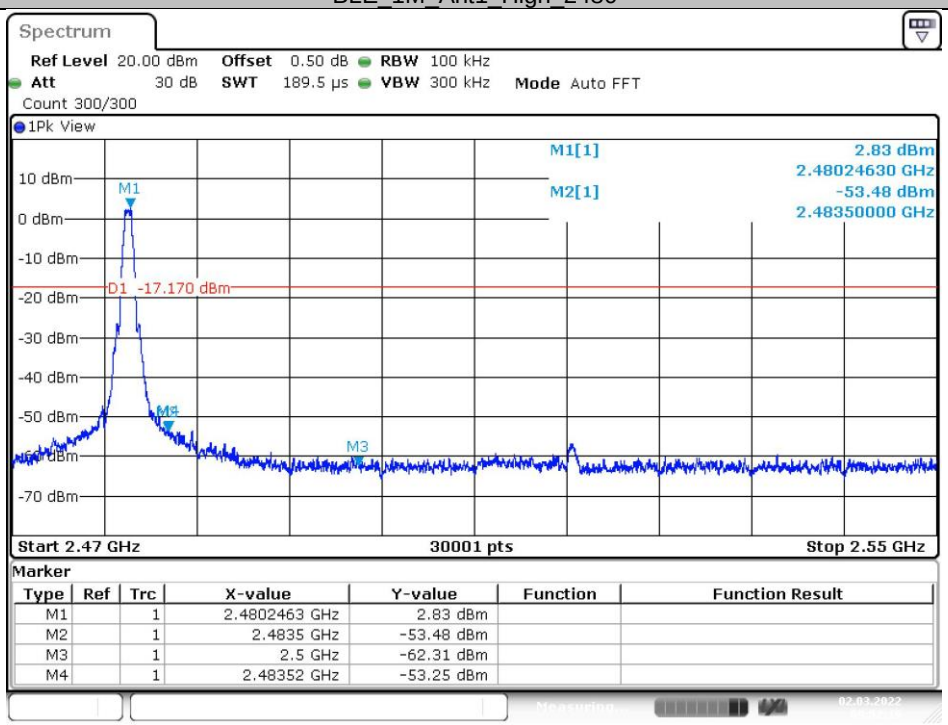


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4020187 GHz	4.37 dBm		
M2		1	2.4 GHz	-47.72 dBm		
M3		1	2.39 GHz	-62.47 dBm		
M4		1	2.39984783 GHz	-46.96 dBm		

Date: 9.MAR.2022 09:14:19

BLE_1M_Ant1_High_2480

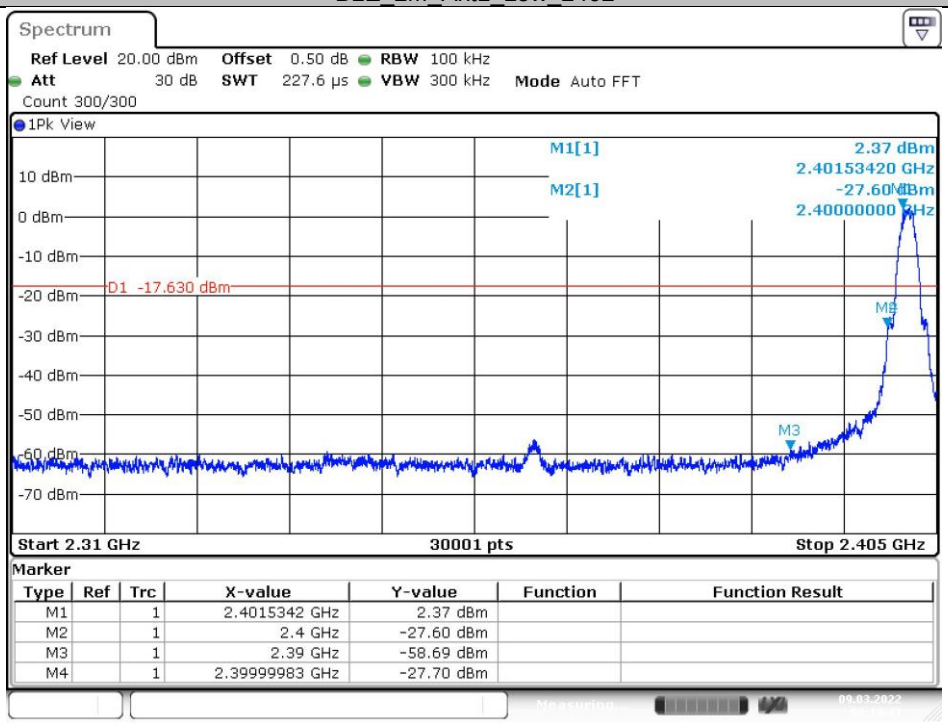


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4802463 GHz	2.83 dBm		
M2		1	2.4835 GHz	-53.48 dBm		
M3		1	2.5 GHz	-62.31 dBm		
M4		1	2.48352 GHz	-53.25 dBm		

Date: 2.MAR.2022 09:52:19

BLE_2M_Ant1_Low_2402

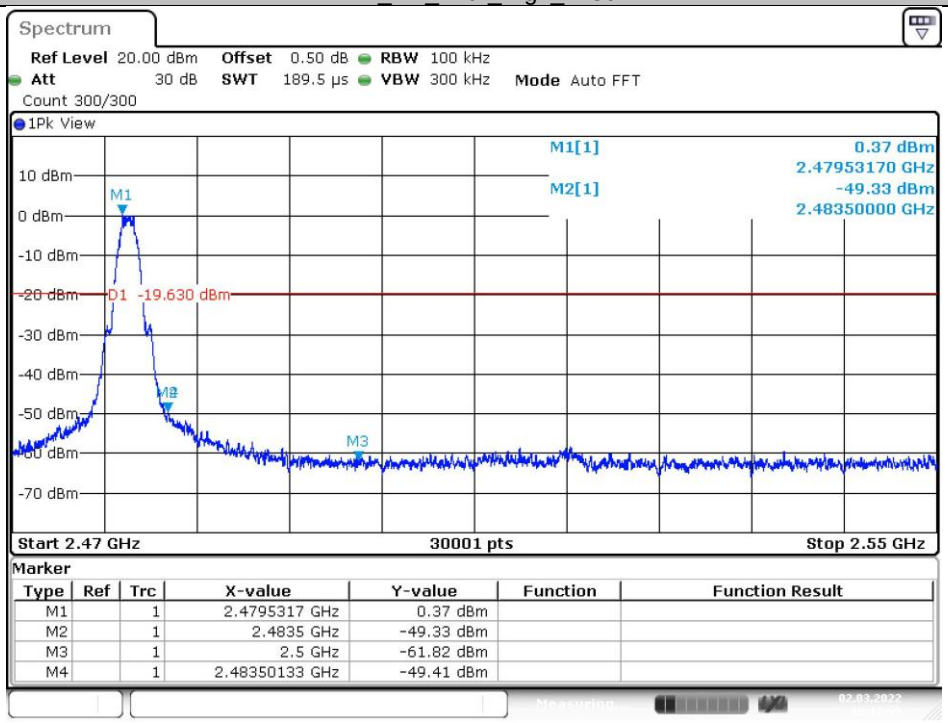


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4015342 GHz	2.37 dBm		
M2		1	2.4 GHz	-27.60 dBm		
M3		1	2.39 GHz	-58.69 dBm		
M4		1	2.39999983 GHz	-27.70 dBm		

Date: 9.MAR.2022 09:14:41

BLE_2M_Ant1_High_2480

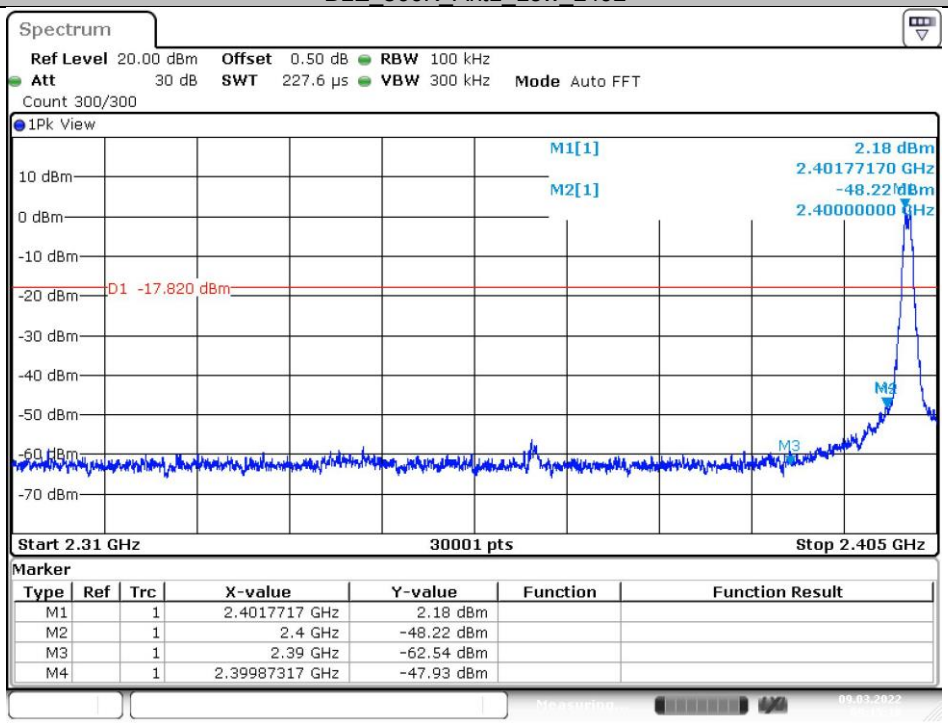


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4795317 GHz	0.37 dBm		
M2		1	2.4835 GHz	-49.33 dBm		
M3		1	2.5 GHz	-61.82 dBm		
M4		1	2.48350133 GHz	-49.41 dBm		

Date: 2.MAR.2022 10:17:35

BLE_500K_Ant1_Low_2402

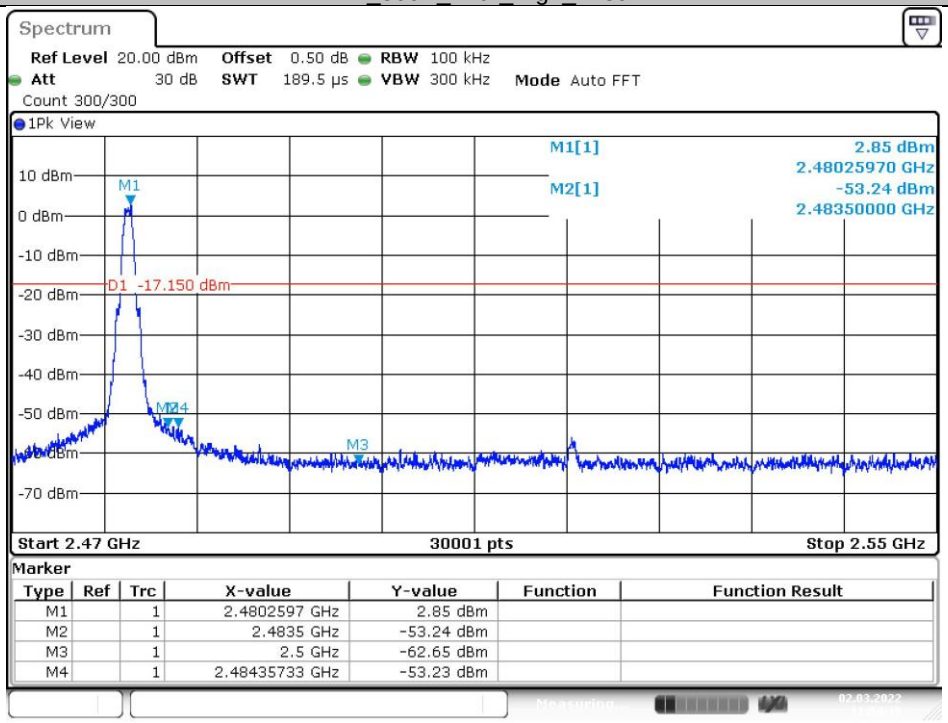


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4017717 GHz	2.18 dBm		
M2		1	2.4 GHz	-48.22 dBm		
M3		1	2.39 GHz	-62.54 dBm		
M4		1	2.39987317 GHz	-47.93 dBm		

Date: 9.MAR.2022 09:15:18

BLE_500K_Ant1_High_2480



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4802597 GHz	2.85 dBm		
M2		1	2.4835 GHz	-53.24 dBm		
M3		1	2.5 GHz	-62.65 dBm		
M4		1	2.48435733 GHz	-53.23 dBm		

Date: 2.MAR.2022 11:54:14

9.7 Spurious radiated emissions for transmitter

Test Method

1. The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3. 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.
4. 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.
5. Use the following spectrum analyzer settings According to C63.10:

For Below 1GHz

Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz to 120 kHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Peak unwanted emissions Above 1GHz:

Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Procedures for average unwanted emissions measurements above 1000 MHz

a) RBW = 1MHz.
b) VBW ≥ [3 × RBW].
c) Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ RBW / 2. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
e) Sweep time = auto.
f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the

emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.
2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.
3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

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 section15.205 and RSS-GEN 8.10 must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Measured Distance Meters
0.009~0.490	2400/F (kHz)	300
0.490~1.705	24000/F (kHz)	30
1.705~30	30	30

Frequency MHz	Field Strength uV/m	Field Strength dBµV/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

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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.
Pre-scan with three orthogonal axis and worst case as X axis. The only worse case test result is listed in the report.

Test result

Test mode: BLE_1M					
Channel 0 (2402MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
2384.2	42.83	74	31.17	Peak	Horizontal
4810.4	42.69	74	31.31	Peak	Horizontal
7205.1	51.87	74	22.13	Peak	Horizontal
2383.3	43.26	74	30.74	Peak	Vertical
4810.4	42.33	74	31.67	Peak	Vertical
7205.5	48.28	74	25.72	Peak	Vertical
Channel 19 (2440MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
4880.1	43.21	74	30.79	Peak	Horizontal
7320.1	52.89	74	21.11	Peak	Horizontal
4880.9	44.06	74	29.94	Peak	Vertical
7319.4	48.34	74	25.66	Peak	Vertical
Channel 39 (2480MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
2483.5	50.83	74	23.17	Peak	Horizontal
7439.6	52.74	74	21.26	Peak	Horizontal
7439.6	50.01	54	3.99	AV	Horizontal
2483.5	50.86	74	23.14	Peak	Vertical
7440.1	48.21	74	25.79	Peak	Vertical

Remark:

(1) Emission level= Original Receiver Reading + Correct Factor
(2) Correct Factor = Antenna Factor + Cable Loss -Amplifier gain
(3) Margin = limit – Corrected Reading

Test mode: BLE_2M					
Channel 0 (2402MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
2384.2	44.64	74	29.36	Peak	Horizontal
4804.6	47.04	74	26.96	Peak	Horizontal
7205.5	50.99	74	23.01	Peak	Horizontal
2383.3	43.49	74	30.51	Peak	Vertical
4810.4	42.21	74	31.79	Peak	Vertical
7205.5	51.24	74	22.76	Peak	Vertical
Channel 19 (2440MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
4880.1	43.15	74	30.85	Peak	Horizontal
7320.1	53.41	74	20.59	Peak	Horizontal
7320.1	50.71	54	3.29	AV	Horizontal
4880.1	42.76	74	31.24	Peak	Vertical
7319.4	48.17	74	25.83	Peak	Vertical
Channel 39 (2480MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
2483.5	51.80	74	22.2	Peak	Horizontal
7439.6	52.47	74	21.53	Peak	Horizontal
2483.5	49.19	74	24.81	Peak	Vertical
7440.1	48.42	74	25.58	Peak	Vertical

Remark:

(1) Emission level= Original Receiver Reading + Correct Factor
(2) Correct Factor = Antenna Factor + Cable Loss -Amplifier gain
(3) Margin = limit – Corrected Reading

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Test mode: BLE_125K					
Channel 0 (2402MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
2384.2	43.33	74	30.67	Peak	Horizontal
4804.6	45.27	74	28.73	Peak	Horizontal
7205.5	51.74	74	22.26	Peak	Horizontal
2383.3	43.18	74	30.82	Peak	Vertical
4810.4	42.35	74	31.65	Peak	Vertical
7205.5	50.46	74	23.54	Peak	Vertical
Channel 19 (2440MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
4880.5	46.37	74	27.63	Peak	Horizontal
7319.4	52.86	74	21.14	Peak	Horizontal
7319.4	50.33	54	3.67	AV	Horizontal
4880.1	42.12	74	31.88	Peak	Vertical
7320.4	48.23	74	25.77	Peak	Vertical
Channel 39 (2480MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
2483.5	49.58	74	24.42	Peak	Horizontal
7439.6	53.66	74	20.34	Peak	Horizontal
7439.6	50.18	54	3.82	AV	Horizontal
2483.5	47.74	74	26.26	Peak	Vertical
7440.1	47.38	74	26.62	Peak	Vertical

Remark:

(1) Emission level= Original Receiver Reading + Correct Factor

(2) Correct Factor = Antenna Factor + Cable Loss -Amplifier gain

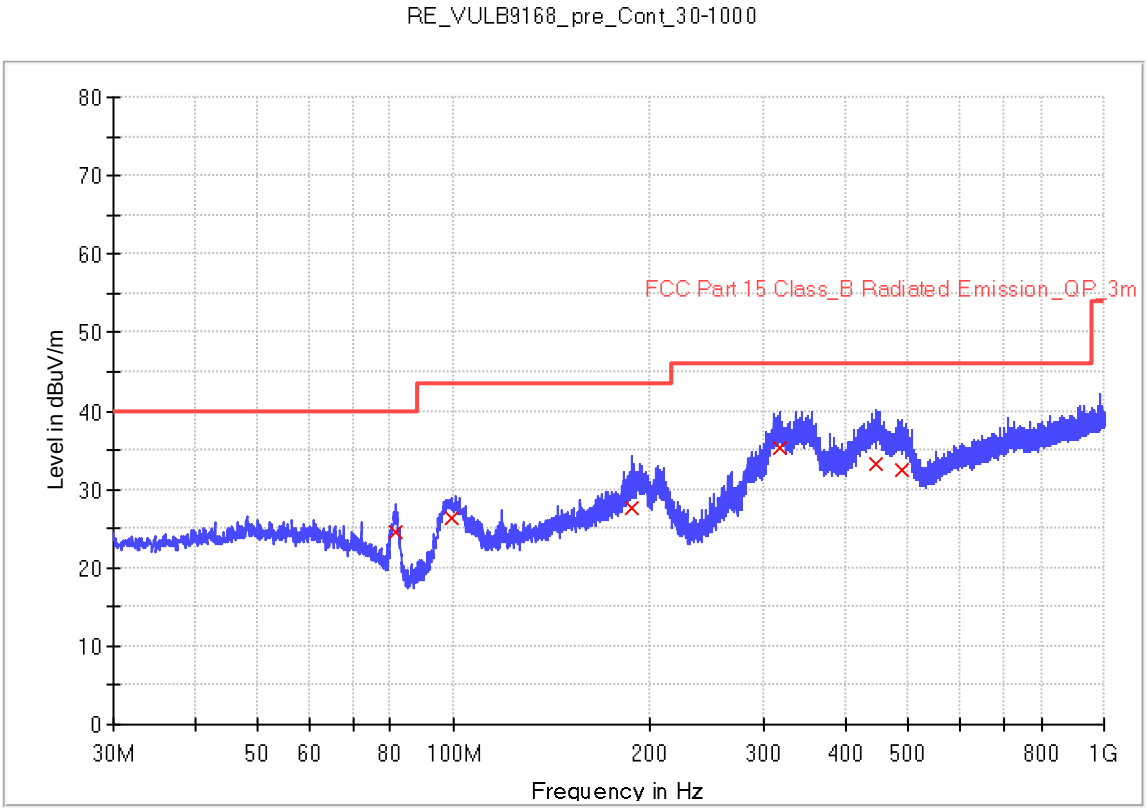
Margin = limit – Corrected Reading

Test mode: BLE_500K					
Channel 0 (2402MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
2384.3	43.69	74	30.31	Peak	Horizontal
4804.6	43.27	74	30.73	Peak	Horizontal
7206.7	52.03	74	21.97	Peak	Horizontal
2383.3	43.12	74	30.88	Peak	Vertical
4810.4	42.61	74	31.39	Peak	Vertical
7207.5	48.19	74	25.81	Peak	Vertical
Channel 19 (2440MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
4880.5	43.37	74	30.63	Peak	Horizontal
7319.4	51.66	74	22.34	Peak	Horizontal
7319.4	48.21	54	5.79	AV	Horizontal
4880.1	42.12	74	31.88	Peak	Vertical
7319.3	48.11	74	25.89	Peak	Vertical
Channel 39 (2480MHz)					
Frequency (MHz)	**Measure Level (dBuV/M)**	**Limit (dBuV/M)**	**Margin (dB)**	**Detector**	**Polarization**
2483.5	50.81	74	23.19	Peak	Horizontal
4959.3	45.97	74	28.03	Peak	Horizontal
7439.6	51.12	54	2.88	AV	Horizontal
2483.5	48.74	74	25.26	Peak	Vertical
7439.6	48.92	74	25.08	Peak	Vertical

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The worst case of Radiated Emission below 1GHz:

Site: 3 meter chamber	Time: 2022/03/01 - 13:58
Limit: FCC_Part15.209_RE(3m)_ClassB	Engineer: Wang Yiquan
Probe: VULB9168	Polarity: Horizontal
EUT: LED Device, Model no: 9290034987	Power: AC 120V,60Hz
Note: Transmit by channel 2402MHz at 2M date rate.	



Limit and Margin

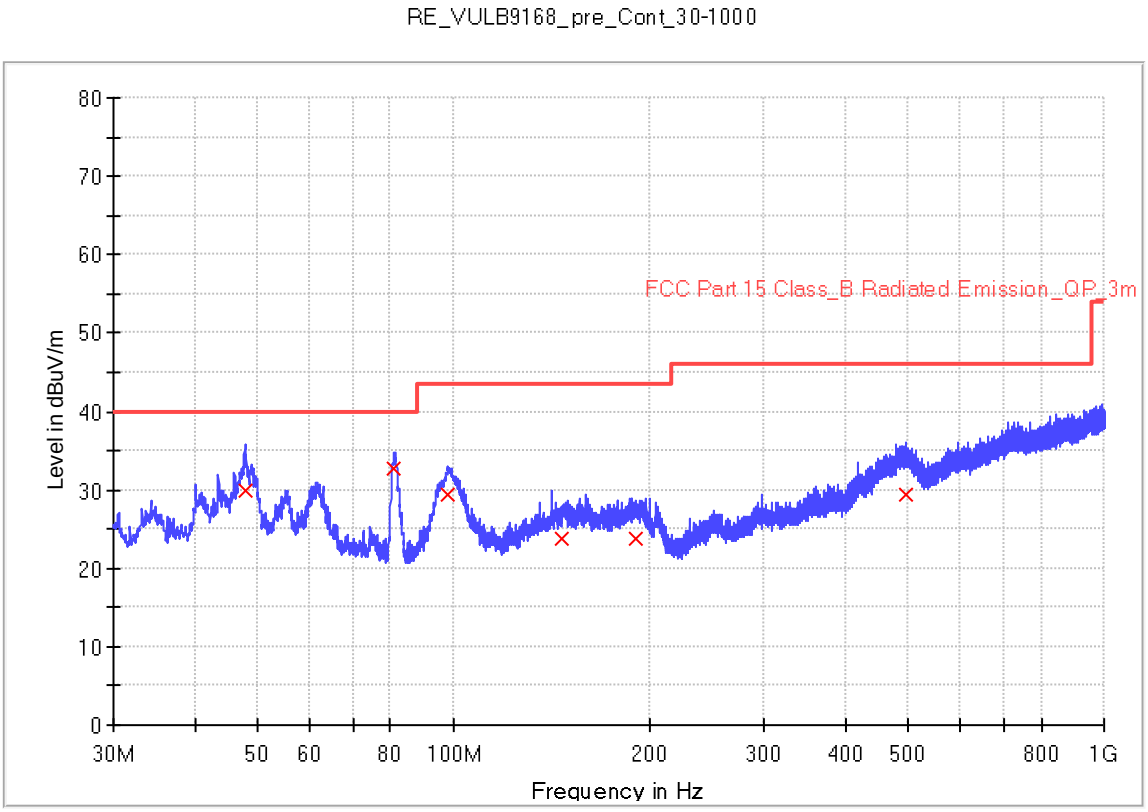
Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
81.280000	24.6	1000.0	120.000	100.1	H	75.0	15.4	15.4	40.0
99.080000	26.3	1000.0	120.000	100.1	H	113.0	16.0	17.2	43.5
187.920000	27.7	1000.0	120.000	100.1	H	157.0	18.6	15.8	43.5
318.000000	35.2	1000.0	120.000	100.1	H	204.0	22.1	10.9	46.0
446.960000	33.3	1000.0	120.000	100.1	H	256.0	25.8	12.7	46.0
487.320000	32.5	1000.0	120.000	100.1	H	359.0	26.4	13.5	46.0

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
3-13, No.151, Heng Tong Road, Shanghai, 200070, P.R. China
Phone: +86 21 61410123, Fax:+86 21 61408600

The worst case of Radiated Emission below 1GHz:

Site: 3 meter chamber	Time: 2022/03/01 - 14:18
Limit: FCC_Part15.209_RE(3m)_ClassB	Engineer: Wang Yiquan
Probe: VULB9168	Polarity: Vertical
EUT: LED Device, Model no: 9290034987	Power: AC 120V,60Hz
Note: Transmit by channel 2402MHz at 2M date rate.	



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
47.800000	29.8	1000.0	120.000	100.1	V	324.0	20.5	10.2	40.0
81.160000	32.7	1000.0	120.000	100.1	V	294.0	15.5	7.3	40.0
97.960000	29.5	1000.0	120.000	100.1	V	252.0	15.8	14.0	43.5
146.400000	23.9	1000.0	120.000	100.1	V	71.0	20.8	19.6	43.5
190.960000	23.7	1000.0	120.000	100.1	V	203.0	18.5	19.8	43.5
495.440000	29.5	1000.0	120.000	100.1	V	150.0	26.5	16.5	46.0

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

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10 Test Equipment List

List of Test Instruments
Test Site1

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DATE	CAL. DUE DATE
C	Signal Analyzer	Rohde & Schwarz	FSV40	101091	2021-8-2	2022-8-1
RE	EMI Test Receiver	Rohde & Schwarz	ESR3	101906	2021-8-2	2022-8-1
	Signal Analyzer	Rohde & Schwarz	FSV40	101091	2021-8-2	2022-8-1
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9168	961	2019-3-16	2022-3-15
	Horn Antenna	Rohde & Schwarz	HF907	102393	2021-3-15	2024-3-14
	Pre-amplifier	Rohde & Schwarz	SCU-18D	19006451	2021-8-2	2022-8-1
	Loop antenna	Rohde & Schwarz	HFH2-Z2	100443	2021-5-21	2022-5-20
	DOUBLE-RIDGED WAVEGUIDE HORN WITH PRE-AMPLIFIER (18 GHZ - 40 GHZ)	ETS-Lindgren	3116C-PA	002222727	2020-9-23	2023-9-22
	3m Semi-anechoic chamber	TDK	9X6X6	----	2021-5-8	2024-5-7
CE	EMI Test Receiver	Rohde & Schwarz	ESR3	101907	2021-8-2	2022-8-1
	LISN	Rohde & Schwarz	ENV216	101924	2021-8-2	2022-8-1

Measurement Software Information			
Test Item	Software	Manufacturer	Version
C	Bluetooth and WiFi Test System	Shenzhen JS tonscend co.,ltd	2.6.77.0518
RE	EMC 32	Rohde & Schwarz	V9.15.00
CE	EMC 32	Rohde & Schwarz	V9.15.03

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth and 99% Occupied Bandwidth
- Power spectral density*
- Spurious RF conducted emissions
- Band edge

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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:

Items	Extended Uncertainty
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, LISN, ±3.16dB
Radiated Disturbance	30MHz to 1GHz, ±5.03dB (Horizontal) ±5.12dB (Vertical) 1GHz to 18GHz, ±5.49dB 18GHz to 40GHz, ±5.63dB
Carrier power conducted measurement	50MHz~18GHz, ±1.238dB
Spurious Emission Conducted Measurement	9kHz ~40GHz, ± 1.224dB

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.

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12 Photographs of Test Set-ups

Refer to the < Test Setup photos >.

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13 Photographs of EUT

Refer to the < External Photos > & < Internal Photos >.

THE END

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