FCC / ISED- TEST REPORT

Report Number	:	64.790.20.05186.01-R2	Date of Issue:	March 24, 2021

Model	:	EU-SK105, US-SK105, EU-OSK105, US-OSK105
Product Type	:	Smart kit
Applicant	:	GD Midea Air-conditioning Equipment Co., Ltd.
Address of applicant	:	Lingang Road, Beijiao, Shunde, Foshan, 528311, Guangdong, China
Manufacturer	:	GD Midea Air-conditioning Equipment Co., Ltd.

Test Result	:	■ **Positive**	☐ **Negative**
Total pages including Appendices	:	35	

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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 City, 518052, P. R. China
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IC Registration Number:	10320A
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3 Description of the Equipment under Test

Product:	Smart Kit
PMN:	Smart Kit
Model no.:	US-OSK105, EU-OSK105, US-SK105, EU-SK105
Model difference:	All models are only difference in model name.
HVIN:	US-OSK105, EU-OSK105, US-SK105, EU-SK105
FVIN:	N/A
FCC ID:	2ADQOMDNA21
IC:	12575A-MDNA21
Options and accessories:	N/A
Rating:	DC 5V (by USB port)
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	40
Modulation:	GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	2.0dBi
Description of the EUT:	Products are smart kits with WIFI and Bluetooth function, they are only can be used in Midea Group's household appliances for controling function. It can not connet to computer for any other function.

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4 Summary of Test Standards

Test Standards	
RSS-Gen Issue 5 March 2019 Amendment 1	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 2 February 2017	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
FCC Part 15 Subpart C 10-1-2020 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB558074 D01 v05r02 and ANSI C63.10 (2013).

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5 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C, RSS-247 Issue 2				
Test Condition			Pages	Test Result
§15.207	RSS-GEN 8.8	Conducted emission AC power port	10	Pass
§15.247(b)(1)	RSS-247 Clause 5.4(d)	Conducted peak output power	13	Pass
§15.247(a)(2)	RSS-247 Clause 5.2(a)	6dB bandwidth and 99% Occupied Bandwidth	15	Pass
§15.247(e)	RSS-247 Clause 5.2(b)	Power spectral density	19	Pass
§15.247(d)	RSS-247 Clause 5.5	Spurious RF conducted emissions	21	Pass
§15.247(d)	RSS-247 Clause 5.5	Band edge	26	Pass
§15.247(d) & §15.209 &	RSS-247 Clause 5.5 & RSS-GEN 6.13	Spurious radiated emissions for transmitter	28	Pass
§15.203	RSS-GEN 6.8	Antenna requirement	See note 1	Pass

Note 1: N/A=Not Applicable.
Note 2: The EUT uses an PCB antenna, which gain is 2.0dBi. In accordance to §15.203 & RSS-Gen 6.8, It is considered sufficiently to comply with the provisions of this section.

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6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID:2ADQOMDNA21 complies with Section 15.207, 15.209, 15.205, 15.247 of the FCC Part 15, Subpart C rules; and IC:12575A-MDNA21 complies with RSS-GEN issue 5 and RSS-247 issue 2.
All models are identical in circuit design, PCB layout and components used but only different in model name. Tests were only performed on EU-SK105.
This report is only for the BLE part.

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: December 1, 2020

Testing Start Date: December 8, 2020

Testing End Date: March 24, 2021

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

Reviewed by:	Prepared by:	Test by:
Tony Liu	Kevin Ouyang	Louise Liu
Reviewer	Project Handler	Test Engineer

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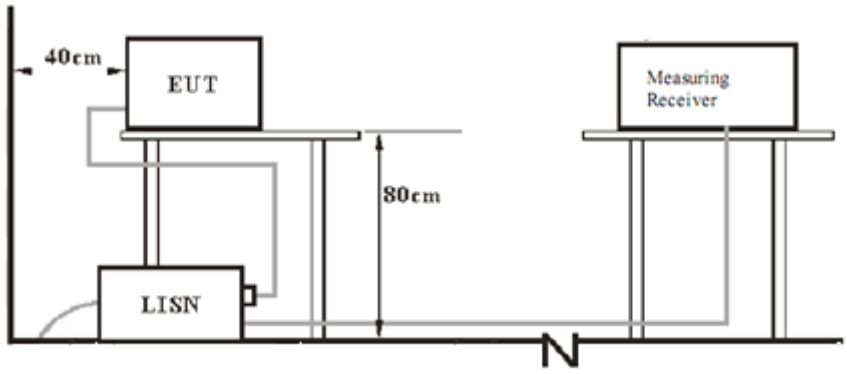
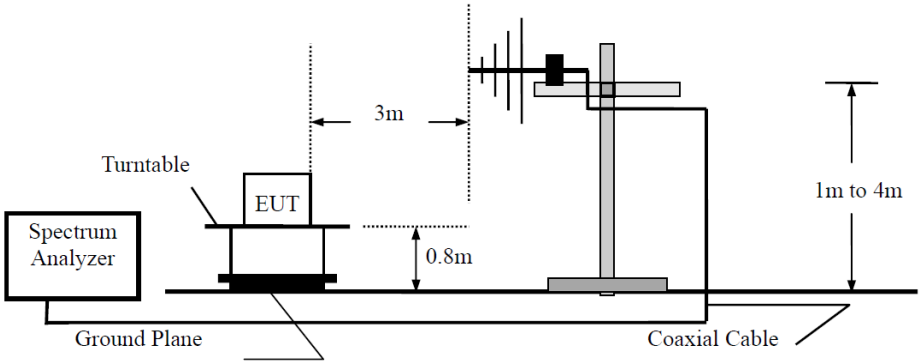
7 Test Setups

7.1 AC Power Line Conducted Emission test setups

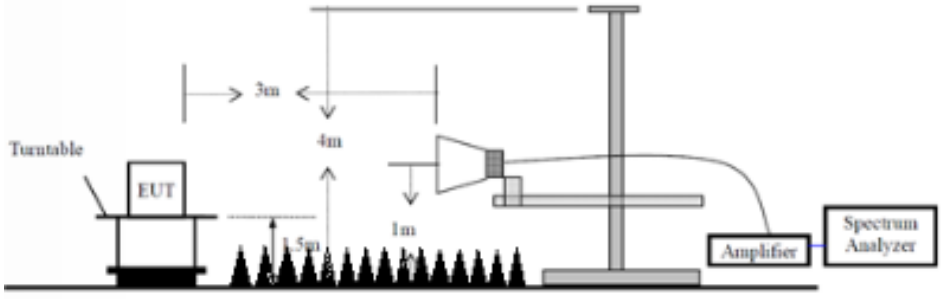


7.2 Radiated test setups

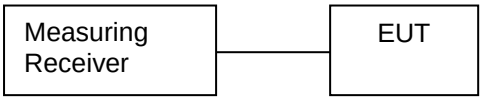
Below 1GHz



Above 1GHz



7.3 Conducted RF test setups



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8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Mobile Phone	Apple	iPhone 6	---
APP	Midea air	Midea	---
Dehumidifier	Midea	US-CFZ1.0BD/N1-DP(A8)-B	---
Laptop	Lenovo	X240	L34015282
Software	Realtek	RTLBTAPP Version: 5.2.2.55	---

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9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

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

Remark: “*” Decreasing linearly with logarithm of the frequency

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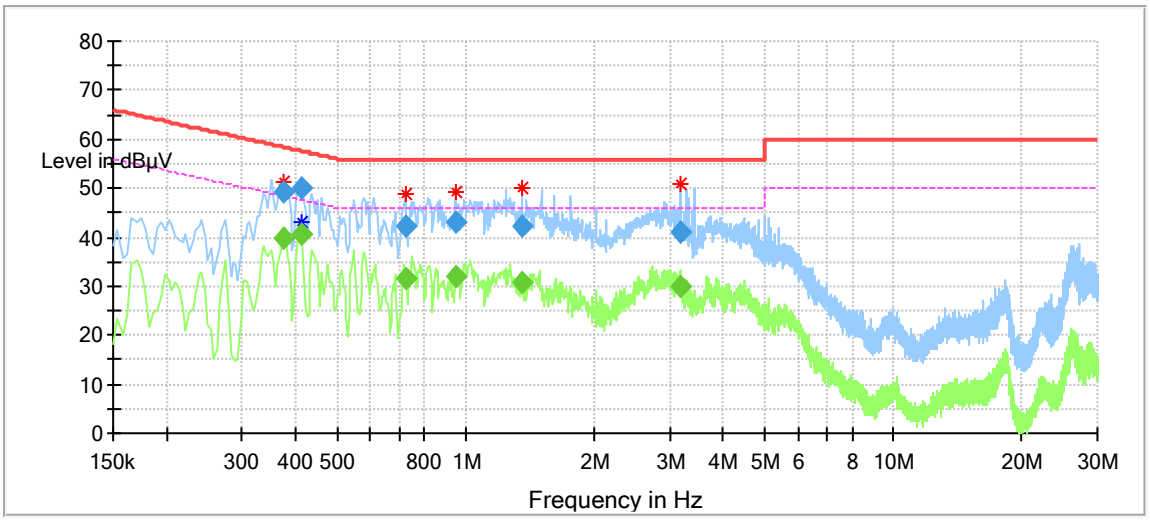
Conducted Emission Test 150kHz – 30MHz

M/N: EU-SK105
Op Cond.: Bluetooth function on.
Test Spec.: Power Line, Live

Temperature (°C): 22.5 Relative Humidity (%): 46.7 Atmospheric Pressure(mbar) : 1012



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.373500	---	39.70	48.42	8.72	L1	9.64
0.373500	49.37	---	58.42	9.06	L1	9.64
0.413500	---	40.59	47.58	6.99	L1	9.64
0.413500	50.23	---	57.58	7.35	L1	9.64
0.721500	---	31.53	46.00	14.47	L1	9.66
0.721500	42.20	---	56.00	13.80	L1	9.66
0.949500	---	31.97	46.00	14.03	L1	9.66
0.949500	43.19	---	56.00	12.81	L1	9.66
1.349500	---	30.91	46.00	15.09	L1	9.67
1.349500	42.36	---	56.00	13.64	L1	9.67
3.177500	---	30.13	46.00	15.87	L1	9.72
3.177500	40.95	---	56.00	15.05	L1	9.72

Remark： Correct factor=cable loss + LISN factor

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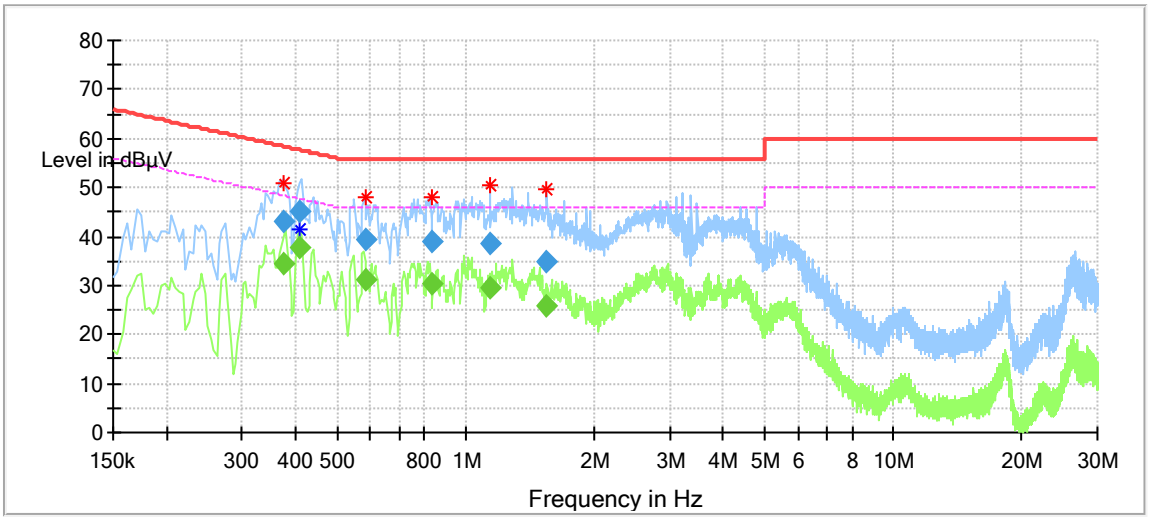
Conducted Emission Test 150kHz – 30MHz

M/N: EU-SK105
Op Cond.: Bluetooth function on.
Test Spec.: Power Line, Neutral

Temperature (°C): 22.5 Relative Humidity (%): 46.7 Atmospheric Pressure(mbar) : 1012



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.374000	43.02	---	58.60	15.58	N	9.64
0.374000	---	34.35	48.60	14.26	N	9.64
0.409500	---	37.59	47.66	10.07	N	9.63
0.409500	45.29	---	57.66	12.36	N	9.63
0.581500	---	30.98	46.00	15.02	N	9.65
0.581500	39.53	---	56.00	16.47	N	9.65
0.830500	---	30.28	46.00	15.72	N	9.65
0.830500	38.92	---	56.00	17.08	N	9.65
1.145500	---	29.51	46.00	16.49	N	9.65
1.145500	38.47	---	56.00	17.53	N	9.65
1.549500	---	25.96	46.00	20.04	N	9.67
1.549500	34.82	---	56.00	21.18	N	9.67

Remark： Correct factor=cable loss + LISN factor

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9.2 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
   RBW > the 6 dB bandwidth of the emission being measured, VBW≥3RBW, Span≥3RBW
   Sweep = auto, Detector function = peak, Trace = max hold.
2. Add a correction factor to the display.
3. 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.

Limits

Conducted Peak Output Power Limit:

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

EIRP Limit :

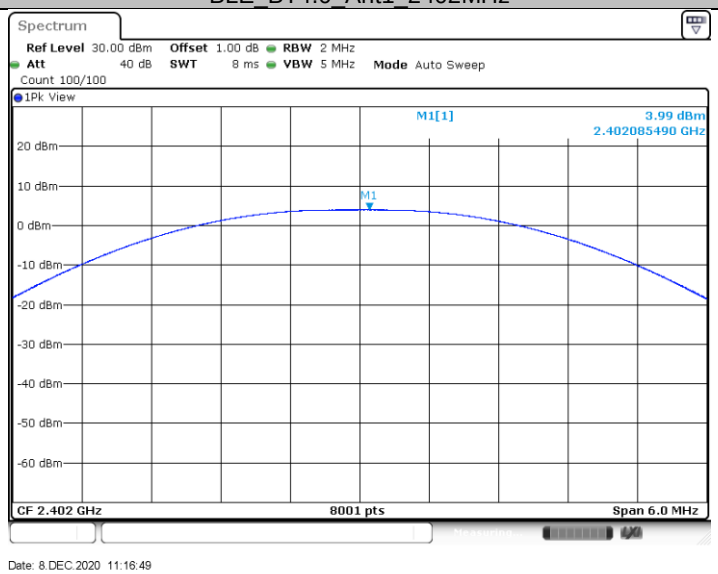
Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤4	≤36

Test Result

Channel (MHz)	Conducted output power (dBm)	E.I.R.P (dBm)	Limit (dBm)	Verdict
2402	3.99	5.99	≤30	PASS
2440	4.35	6.35	≤30	PASS
2480	4.27	6.27	≤30	PASS

Test Graphs

BLE_BT4.0_Ant1_2402MHz



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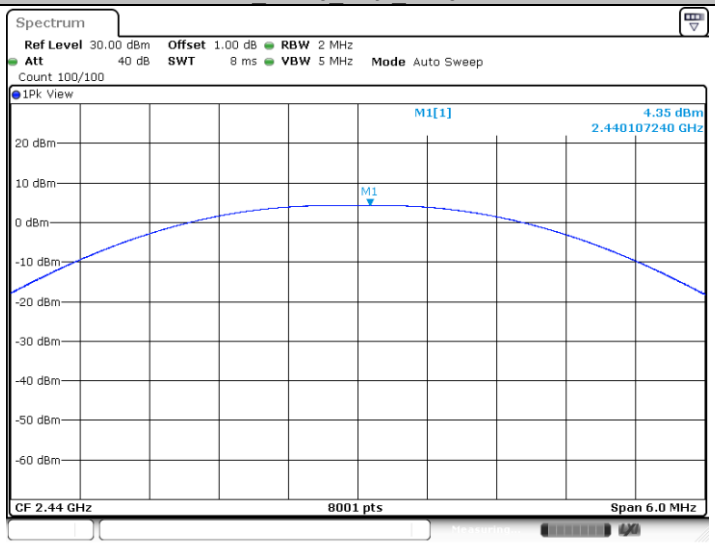
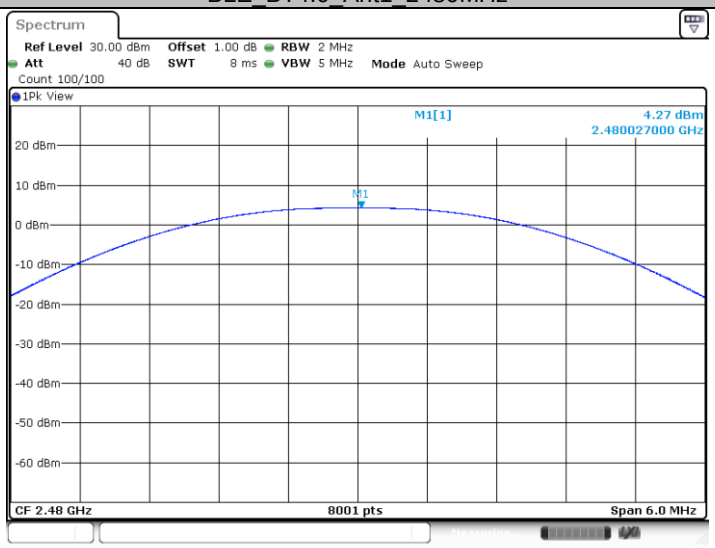
BLE_BT4.0_Ant1_2440MHz

BLE_BT4.0_Ant1_2480MHz


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9.3 6dB bandwidth and 99% Occupied Bandwidth

Test Method

1. Use the following spectrum analyzer settings:
   RBW=100K, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.
3. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

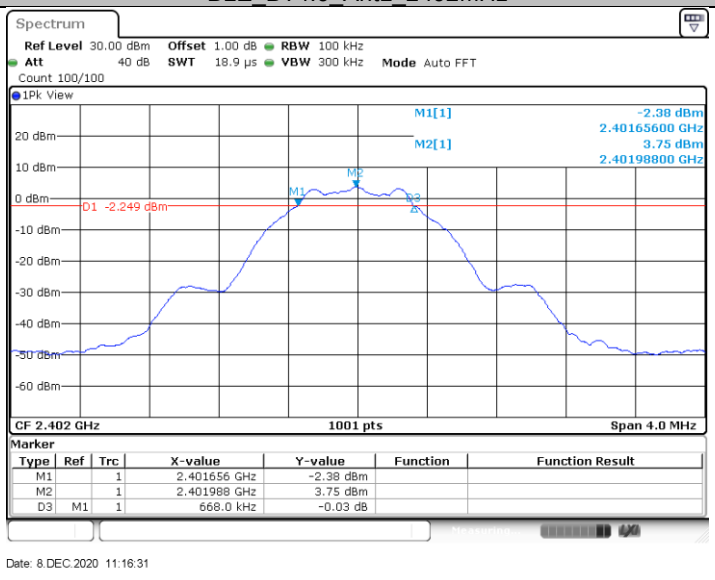
Limit [kHz]
≥500

Test result

Channel(MHz)	6dB BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
2402	0.668	2401.656	2402.324	0.5	PASS
2440	0.660	2439.660	2440.320	0.5	PASS
2480	0.668	2479.656	2480.324	0.5	PASS

Test Graphs

BLE_BT4.0_Ant1_2402MHz



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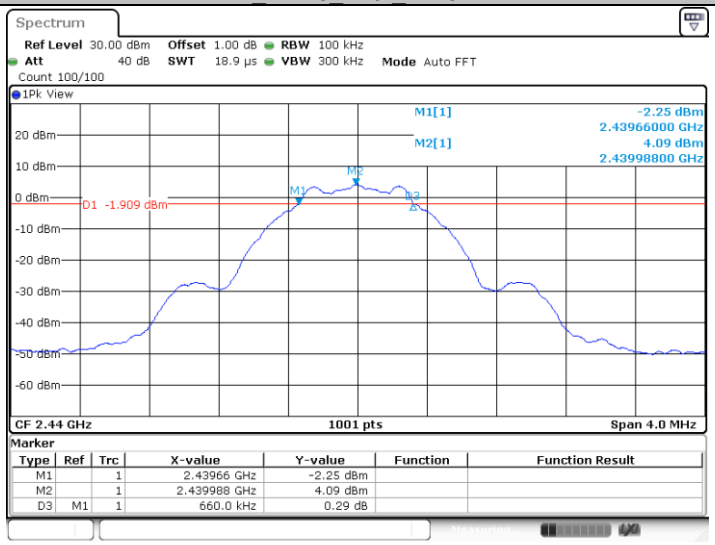
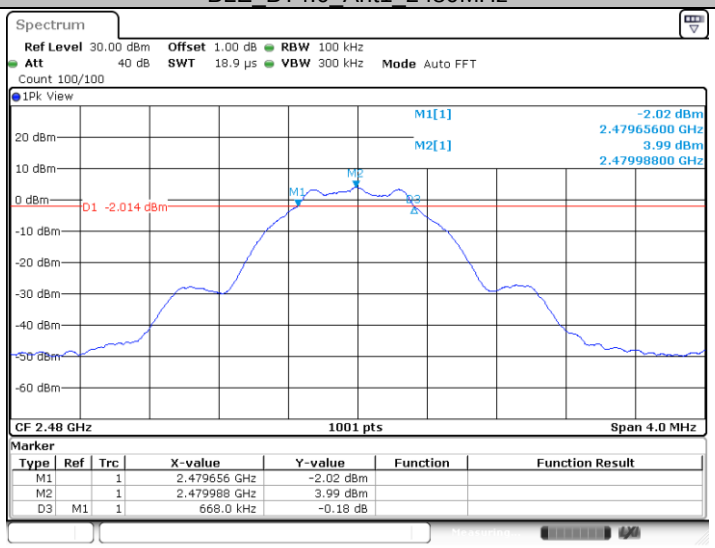
BLE_BT4.0_Ant1_2440MHz
 Date: 8.DEC.2020 11:18:25
BLE_BT4.0_Ant1_2480MHz
 Date: 8.DEC.2020 11:20:16

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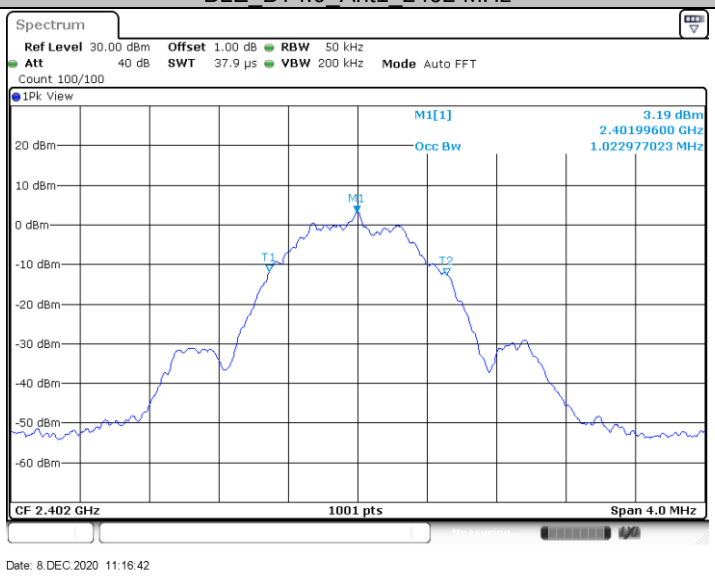
Channel(MHz)	99% OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
2402	1.023	2401.489	2402.511	---	PASS
2440	1.027	2439.485	2440.511	---	PASS
2480	1.027	2479.485	2480.511	---	PASS

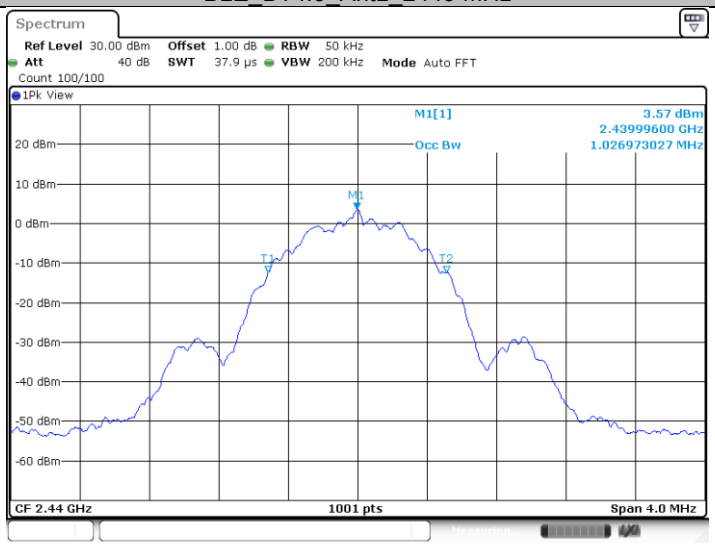
Test Graphs

BLE_BT4.0_Ant1_2402 MHz



Date: 8.DEC.2020 11:16:42

BLE_BT4.0_Ant1_2440 MHz



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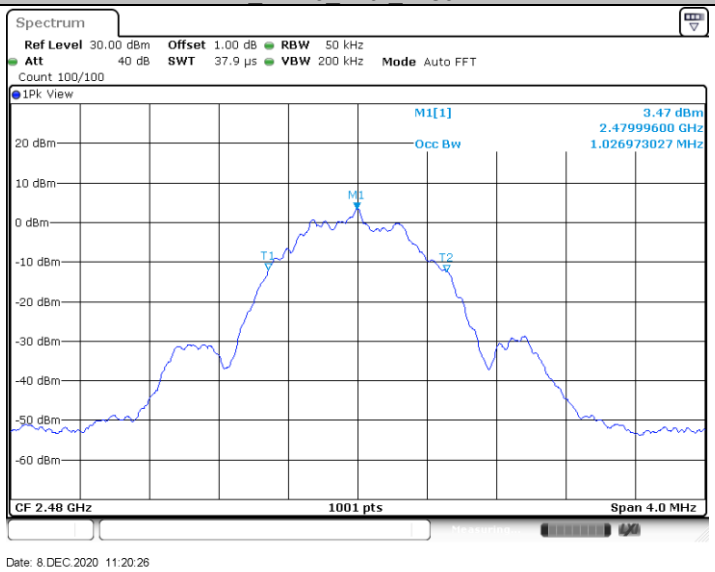
BLE_BT4.0_Ant1_2480 MHz



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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=10kHz,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

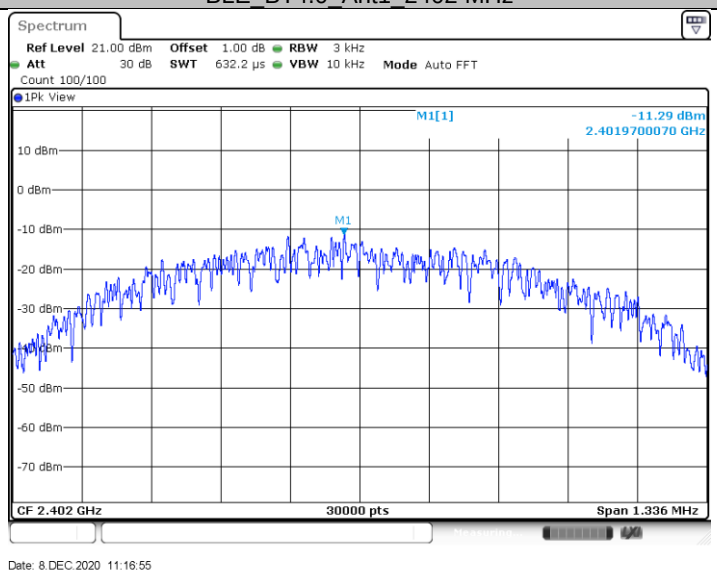
Limit [dBm/3KHz]
≤8

Test result

Channel(MHz)	Result(dBm/3KHz)	Limit(dBm/3KHz)	Verdict
2402	-11.29	<=8	PASS
2440	-12.19	<=8	PASS
2480	-11.79	<=8	PASS

Test Graphs

BLE_BT4.0_Ant1_2402 MHz



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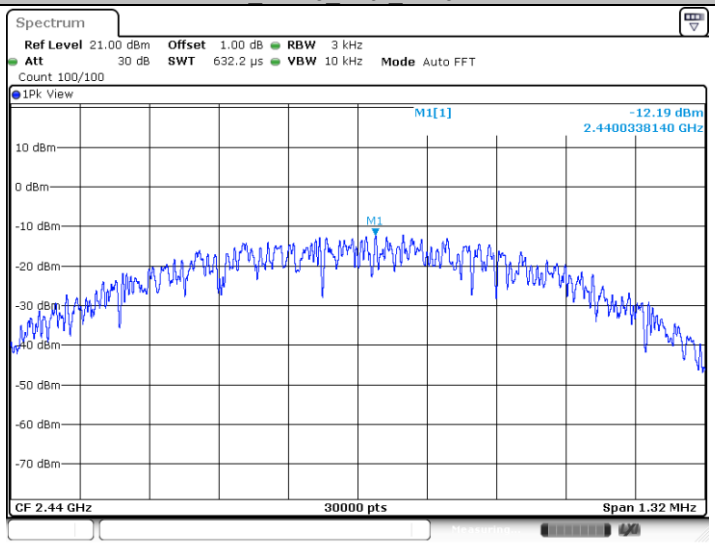
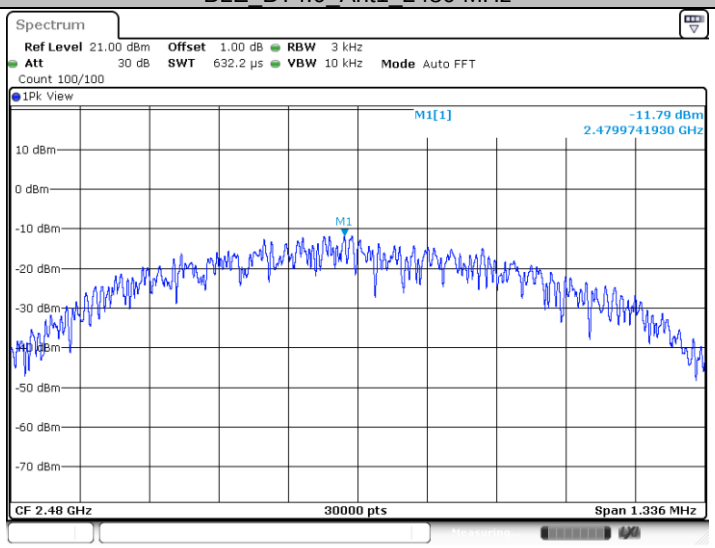
BLE_BT4.0_Ant1_2440 MHz

BLE_BT4.0_Ant1_2480 MHz


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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

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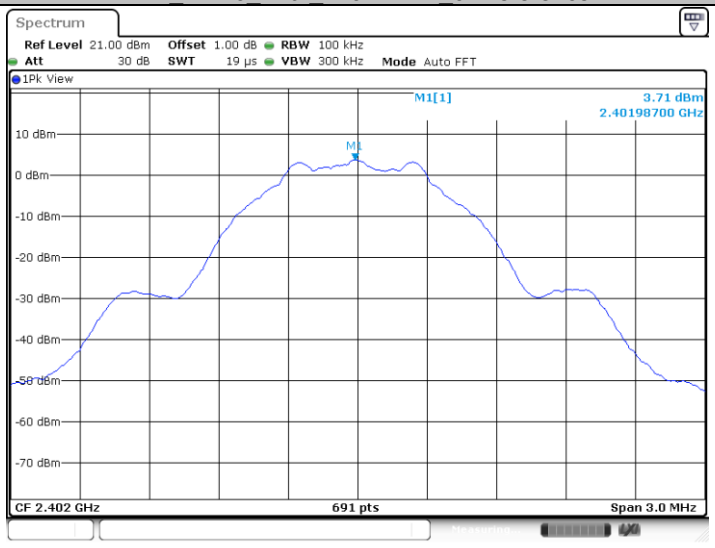
Spurious RF conducted emissions

Test Result

Channel(MHz)	Freq Range (MHz)	RefLevel	Result(dBm)	Limit(dBm)	Verdict
2402	Reference	3.71 dBm	3.71	---	PASS
	30~1000	30~1000 MHz	-56.01	<=-16.29	PASS
	1000~26500	1000~26500 MHz	-48.9	<=-16.29	PASS
2440	Reference	4.07 dBm	4.07	---	PASS
	30~1000	30~1000 MHz	-56.19	<=-15.93	PASS
	1000~26500	1000~26500 MHz	-52.02	<=-15.93	PASS
2480	Reference	3.96 dBm	3.96	---	PASS
	30~1000	30~1000 MHz	-56.42	<=-16.04	PASS
	1000~26500	1000~26500 MHz	-52.11	<=-16.04	PASS

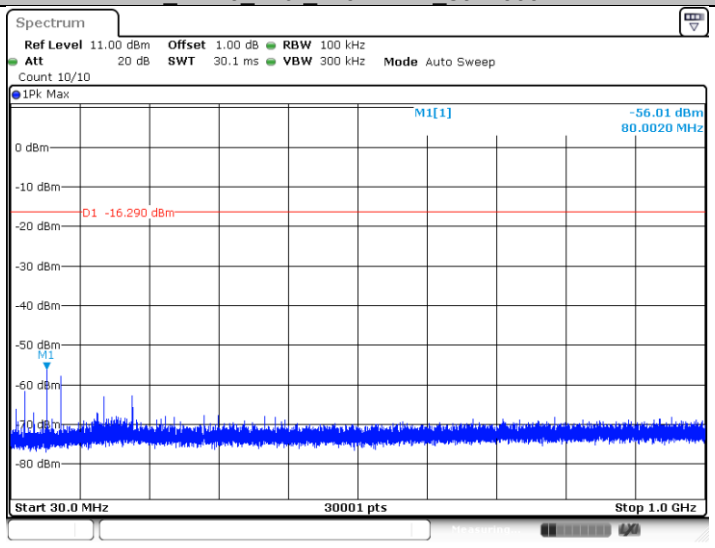
Test Graphs

BLE_BT4.0_Ant1_2402 MHz _0~Reference



Date: 8.DEC.2020 11:17:10

BLE_BT4.0_Ant1_2402 MHz _30~1000 MHz



Date: 8.DEC.2020 11:17:16

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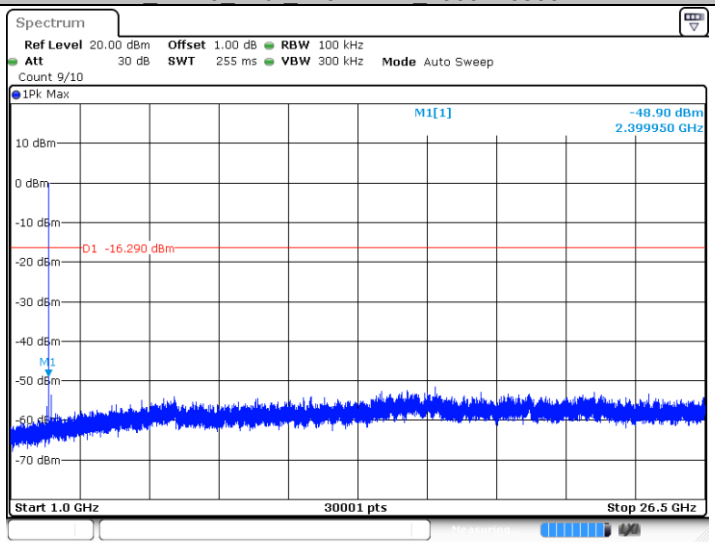
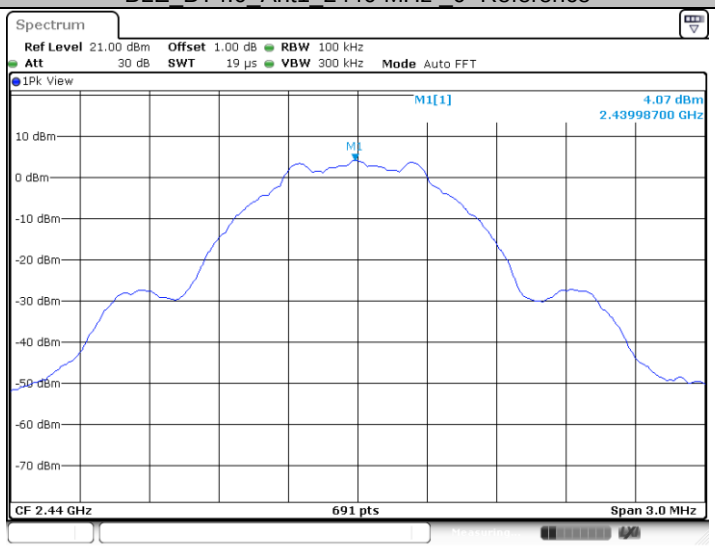
BLE_BT4.0_Ant1_2402 MHz _1000~26500 MHz



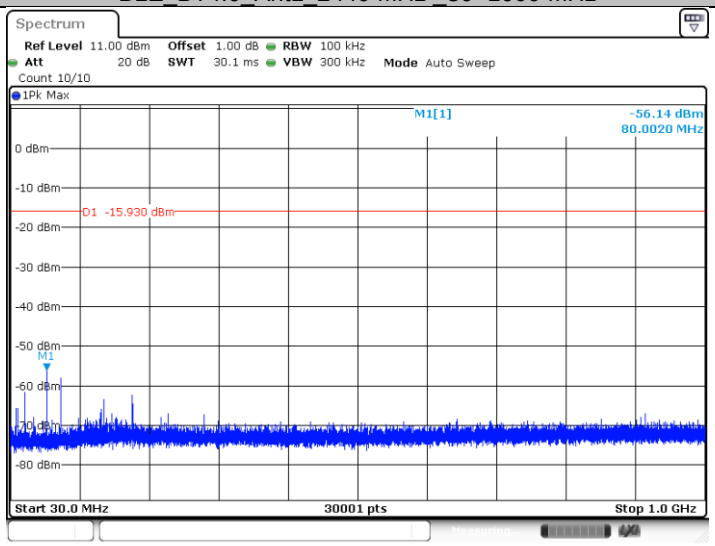
Date: 8.DEC.2020 11:17:24

BLE_BT4.0_Ant1_2440 MHz _0~Reference



Date: 8.DEC.2020 11:18:53

BLE_BT4.0_Ant1_2440 MHz _30~1000 MHz



Date: 8.DEC.2020 11:18:59

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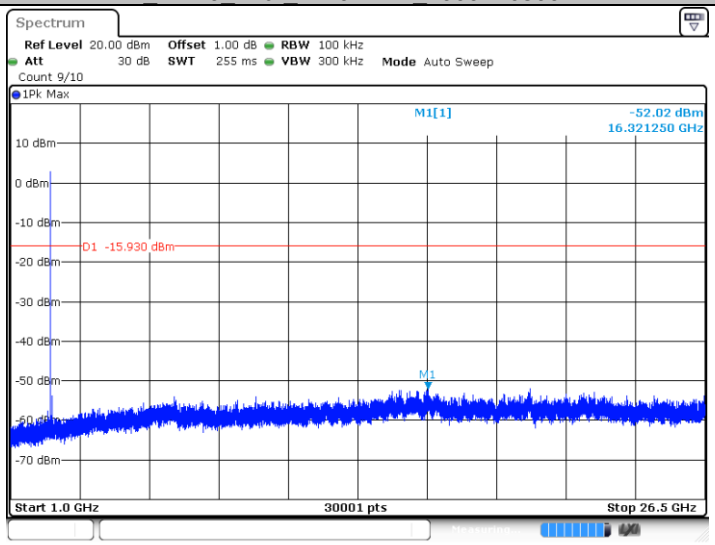
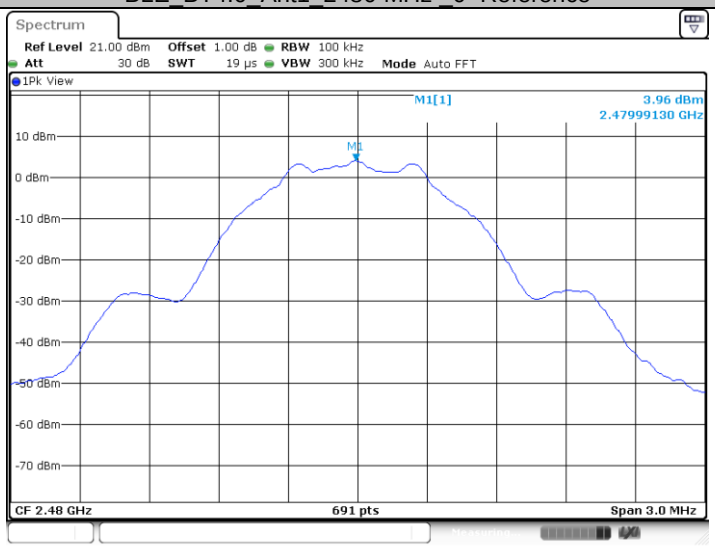
BLE_BT4.0_Ant1_2440 MHz _1000~26500 MHz



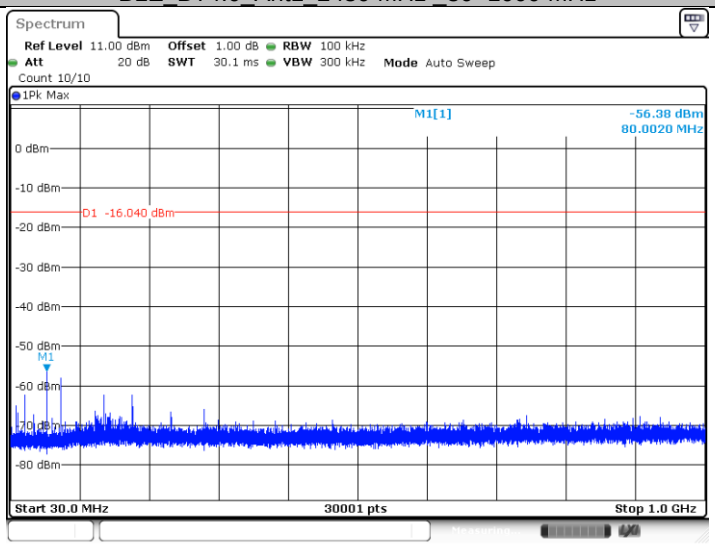
Date: 8.DEC.2020 11:19:07

BLE_BT4.0_Ant1_2480 MHz _0~Reference



Date: 8.DEC.2020 11:20:54

BLE_BT4.0_Ant1_2480 MHz _30~1000 MHz



Date: 8.DEC.2020 11:21:00

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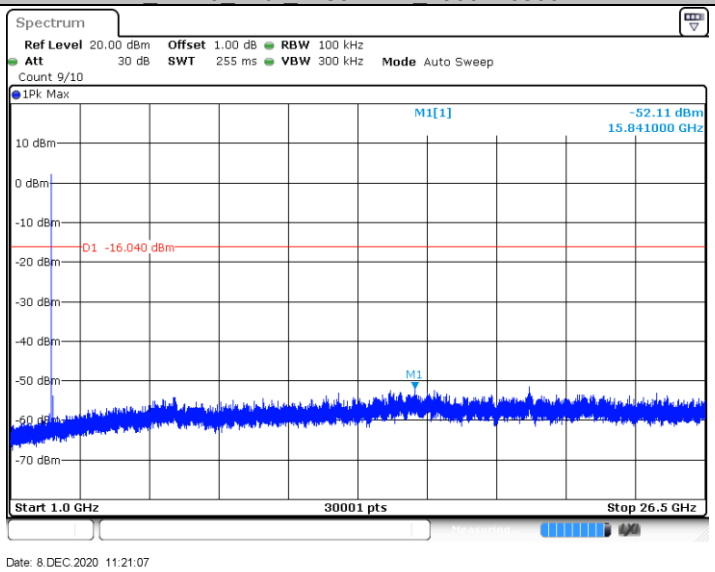
BLE_BT4.0_Ant1_2480 MHz _1000~26500 MHz



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9.6 Band edge

Test Method

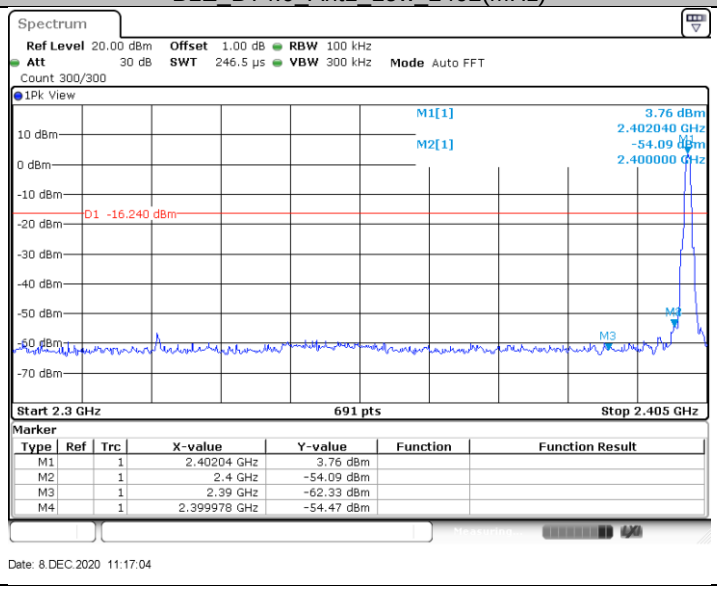
1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold.
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.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

Limit

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), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test result

BLE_BT4.0_Ant1_Low_2402(MHz)



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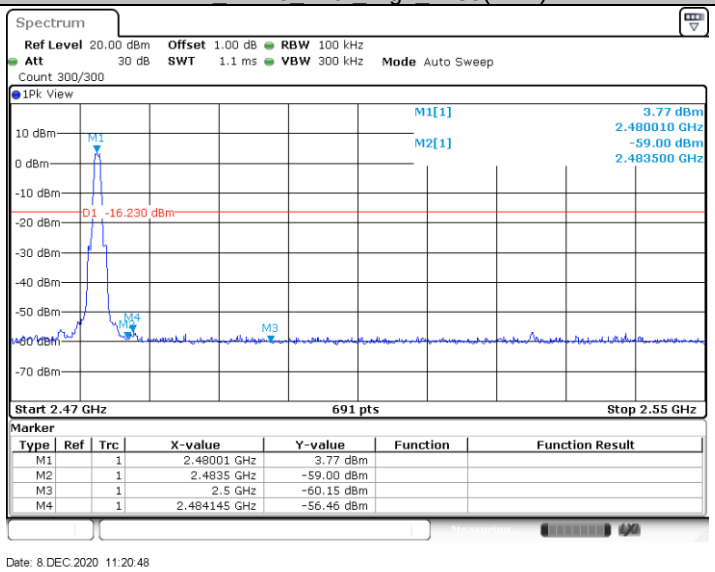
BLE_BT4.0_Ant1_High_2480(MHz)



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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 120KHz, 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 = 1 MHz.

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

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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

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

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.

Transmitting spurious emission test result as below:

Transmitting spurious emission test result as below:

30MHz - 1GHz

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
96.013889	28.63	43.50	14.87	200.0	H	349.0	12.03
132.011667	36.22	43.50	7.28	200.0	H	313.0	9.70
168.009444	38.20	43.50	5.30	200.0	H	323.0	10.13
215.970556	38.95	43.50	4.55	200.0	H	160.0	12.64
119.940556	28.16	43.50	15.34	100.0	V	47.0	10.59
168.009444	35.72	43.50	7.78	100.0	V	235.0	10.13
263.985556	28.64	46.00	17.36	100.0	V	250.0	13.96

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2402MHz (Above 1GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	PK Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1020.000000	40.10	74.00	33.90	150.0	H	38.0	-10.12
1369.000000	40.10	74.00	33.90	150.0	H	173.0	-8.71
1867.500000	41.67	74.00	32.33	150.0	H	189.0	-5.23
1960.500000	42.95	74.00	31.05	150.0	H	356.0	-4.54
2852.500000	45.70	74.00	28.30	150.0	H	291.0	-1.87
5876.500000	52.04	74.00	21.96	150.0	H	15.0	5.58
1901.000000	41.29	74.00	32.71	150.0	H	291.0	-5.01
2549.000000	43.21	74.00	30.79	150.0	H	139.0	-2.75
3024.000000	46.17	74.00	27.83	150.0	H	178.0	-1.23
4133.000000	48.86	74.00	25.14	150.0	H	147.0	1.73
4373.000000	48.59	74.00	25.41	150.0	H	4.0	2.13
5558.000000	52.34	74.00	21.66	150.0	H	194.0	4.41
18711.562500	41.50	74.00	32.50	150.0	H	296.0	-1.89
19232.687500	41.80	74.00	32.20	150.0	H	52.0	-1.90
20365.687500	42.78	74.00	31.22	150.0	H	174.0	-0.73
21317.187500	43.18	74.00	30.82	150.0	H	83.0	0.24
22255.625000	43.19	74.00	30.81	150.0	H	337.0	0.89
24815.875000	42.89	74.00	31.11	150.0	H	220.0	1.39
1113.500000	38.19	74.00	35.81	150.0	V	213.0	-9.71
1425.000000	37.33	74.00	36.67	150.0	V	30.0	-8.51
1996.500000	44.63	74.00	29.37	150.0	V	197.0	-4.14
2726.500000	45.77	74.00	28.23	150.0	V	236.0	-2.26
2836.000000	46.66	74.00	27.34	150.0	V	77.0	-1.92
5325.000000	51.75	74.00	22.25	150.0	V	119.0	3.84
1261.000000	39.24	74.00	34.76	150.0	V	265.0	-9.12
1705.500000	41.71	74.00	32.29	150.0	V	194.0	-6.47
1936.500000	44.30	74.00	29.70	150.0	V	233.0	-4.56
2405.500000	43.27	74.00	30.73	150.0	V	0.0	-3.13
2848.500000	45.81	74.00	28.19	150.0	V	30.0	-1.88
5924.500000	51.80	74.00	22.20	150.0	V	335.0	5.46
18536.937500	42.04	74.00	31.96	150.0	V	0.0	-1.68
19551.000000	41.26	74.00	32.74	150.0	V	199.0	-1.44
20457.812500	42.44	74.00	31.56	150.0	V	144.0	-0.57
21448.500000	43.61	74.00	30.39	150.0	V	83.0	0.29
22780.875000	43.21	74.00	30.79	150.0	V	6.0	0.98
23881.562500	43.78	74.00	30.22	150.0	V	75.0	1.03

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2440MHz (Above 1GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	PK Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1008.500000	43.31	74.00	30.69	150.0	H	61.0	-10.16
1334.500000	38.35	74.00	35.65	150.0	H	257.0	-8.80
1926.500000	40.79	74.00	33.21	150.0	H	345.0	-4.56
2164.500000	43.41	74.00	30.59	150.0	H	147.0	-3.84
2844.000000	45.82	74.00	28.18	150.0	H	296.0	-1.89
5819.000000	51.82	74.00	22.18	150.0	H	85.0	5.16
1032.000000	41.23	74.00	32.77	150.0	H	60.0	-10.04
1333.500000	37.65	74.00	36.35	150.0	H	271.0	-8.81
1495.500000	37.78	74.00	36.22	150.0	H	345.0	-8.27
2056.500000	41.74	74.00	32.26	150.0	H	44.0	-4.08
2969.500000	46.87	74.00	27.13	150.0	H	107.0	-1.50
5850.000000	51.17	74.00	22.83	150.0	H	161.0	5.38
18456.500000	43.19	74.00	30.81	150.0	H	4.0	-1.83
20388.375000	43.02	74.00	30.98	150.0	H	178.0	-0.69
24362.125000	44.19	74.00	29.81	150.0	H	155.0	1.18
30748.312500	47.64	74.00	26.36	150.0	H	125.0	2.97
36128.687500	48.87	74.00	25.13	150.0	H	110.0	5.93
39676.875000	48.86	74.00	25.14	150.0	H	247.0	9.24
1262.500000	37.94	74.00	36.06	150.0	V	174.0	-9.11
1842.000000	42.89	74.00	31.11	150.0	V	205.0	-5.45
2006.000000	45.81	74.00	28.19	150.0	V	228.0	-4.28
2101.000000	44.26	74.00	29.74	150.0	V	236.0	-4.05
3032.500000	46.22	74.00	27.78	150.0	V	0.0	-1.26
5891.500000	51.48	74.00	22.52	150.0	V	359.0	5.55
1682.500000	39.74	74.00	34.26	150.0	V	187.0	-6.66
1743.000000	41.22	74.00	32.78	150.0	V	210.0	-6.13
2063.000000	43.92	74.00	30.08	150.0	V	226.0	-4.06
2204.000000	46.63	74.00	27.37	150.0	V	202.0	-3.69
3207.500000	46.09	74.00	27.91	150.0	V	210.0	-0.88
3932.500000	48.24	74.00	25.76	150.0	V	356.0	1.17
18409.062500	44.03	74.00	29.97	150.0	V	193.0	-1.93
20024.000000	41.83	74.00	32.17	150.0	V	307.0	-1.40
20395.250000	42.45	74.00	31.55	150.0	V	223.0	-0.68
21437.500000	44.03	74.00	29.97	150.0	V	238.0	0.29
22067.250000	42.76	74.00	31.24	150.0	V	4.0	0.60
24112.562500	43.64	74.00	30.36	150.0	V	30.0	1.12

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2480MHz (Above 1GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	PK Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1008.500000	41.45	74.00	32.55	150.0	H	54.0	-10.16
1441.000000	38.04	74.00	35.96	150.0	H	337.0	-8.46
1759.000000	39.94	74.00	34.06	150.0	H	267.0	-5.99
2163.500000	42.29	74.00	31.71	150.0	H	155.0	-3.84
2560.500000	45.88	74.00	28.12	150.0	H	0.0	-2.72
2686.000000	45.82	74.00	28.18	150.0	H	345.0	-2.36
5902.000000	52.17	74.00	21.83	150.0	H	30.0	5.52
1862.500000	42.11	74.00	31.89	150.0	H	259.0	-5.28
2392.000000	43.74	74.00	30.26	150.0	H	181.0	-3.15
2864.000000	46.16	74.00	27.84	150.0	H	173.0	-1.84
3736.000000	47.38	74.00	26.62	150.0	H	63.0	0.49
4280.000000	49.23	74.00	24.77	150.0	H	322.0	1.94
5658.500000	52.46	74.00	21.54	150.0	H	345.0	4.65
18558.937500	42.64	74.00	31.36	150.0	H	299.0	-1.69
18943.937500	40.82	74.00	33.18	150.0	H	284.0	-1.84
20098.250000	42.54	74.00	31.46	150.0	H	39.0	-1.37
21253.250000	43.34	74.00	30.66	150.0	H	46.0	0.27
22465.312500	42.95	74.00	31.05	150.0	H	130.0	1.05
24910.750000	43.31	74.00	30.69	150.0	H	153.0	1.59
1404.500000	40.27	74.00	33.73	150.0	V	102.0	-8.59
1705.000000	41.76	74.00	32.24	150.0	V	205.0	-6.48
1774.500000	42.26	74.00	31.74	150.0	V	221.0	-5.92
2164.500000	43.15	74.00	30.85	150.0	V	133.0	-3.84
3282.000000	47.41	74.00	26.59	150.0	V	38.0	-0.76
5682.500000	51.18	74.00	22.82	150.0	V	306.0	4.73
1334.500000	40.86	74.00	33.14	150.0	V	228.0	-8.80
2032.500000	43.79	74.00	30.21	150.0	V	189.0	-4.14
2244.500000	45.28	74.00	28.72	150.0	V	30.0	-3.56
2484.000000	44.18	74.00	29.82	150.0	V	0.0	-2.92
2997.000000	46.32	74.00	27.68	150.0	V	96.0	-1.43
5899.500000	52.62	74.00	21.38	150.0	V	197.0	5.53
18429.687500	43.28	74.00	30.72	150.0	V	245.0	-1.89
19093.812500	43.02	74.00	30.98	150.0	V	321.0	-1.78
20452.312500	42.84	74.00	31.16	150.0	V	276.0	-0.58
21350.875000	43.40	74.00	30.60	150.0	V	91.0	0.25
22140.125000	43.35	74.00	30.65	150.0	V	0.0	0.73
22469.437500	43.05	74.00	30.95	150.0	V	15.0	1.04

Remark:

(1) Data of Data of measurement within frequency range18-26GHz are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so test data does not present in this report.

(2) Level =Reading Level + Correction 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)

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10 Test Equipment List

List of Test Instruments

Conducted Emission Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2021-6-29
LISN	Rohde & Schwarz	ENV216	100326	2021-6-12

Radiated Emission Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2021-6-29
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9162	284	2022-2-24
Wave Guide Antenna	ETS	3117	00218954	2021-6-15
Pre-amplifier	Rohde & Schwarz	SCU 18F	100745	2021-10-25
Pre-amplifier	Rohde & Schwarz	SCU 08F2	08400018	2021-10-25
Sideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2021-8-5
Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2021-7-30
3m Semi-anechoic chamber	TDK	9X6X6	----	2022-12-29
Test software	Rohde & Schwarz	EMC32	Version10.35.02	N/A

RF conducted test

Description	Manufacturer	Model no.	Serial no.	cal. due date
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2021-6-21
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2021-6-22
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2021-6-21
Power Splitter	Weinschel	1580	SC319	2021-7-16
10dB Attenuator	Weinschel	4M-10	43152	2021-6-21
Test software	Rohde & Schwarz	EMC32	Version 10.60.10	N/A
Test software	Tonscend	System for BT/WIFI	Version 2.6.77.0518	N/A

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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:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted Emission 150kHz-30MHz	3.21dB
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.80dB; Vertical: 4.87dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.59dB; Vertical: 4.58dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 5.05dB; Vertical: 5.04dB;
Uncertainty for Conducted RF test with TS 8997	Power level test involved: 1.16dB Frequency test involved: 0.6×10^{-7} or 1%

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