FCC Part 15 Subpart B&C §15.247

Test Report

Equipment Under Test	**Bluetooth Headphones**
Model Name	**MBN001**
Variant Model Name	**MBN001BA, MBN001CA**
FCC ID	**2A58O-MBN001**
IC Number	**-**
Applicant	**NTT SONORITY, Inc.**
Manufacturer	**KH ELECTRON PHILS. CORP**
Date of Test(s)	**2023. 07. 24 ~ 2023. 08. 03**
Date of Issue	**2023. 08. 16**

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
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Issue to	Issue by
NTT SONORITY, Inc. 3-20-2, Nishishinjuku, Shinjuku-ku, Tokyo 163-1432, Japan Tel.: +81 80-8231-5126 Fax: -	**DEKRA Korea Co., Ltd.** 498-2, Geumeo-ro, Pogok-eup, Cheoin-gu, Yongin-si, Gyeonggi-do, 17030, Rep. of Korea Tel.: +82 31-338-8837 Fax: +82 31-338-8847

Revision history

Revision	Date of issue	Description	Revised by
--	2023.08.16	Initial	-
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Table of contents

1. Applicant Information 4
2. Laboratory Information 4
3. Summary of test results 5
4. EUT Description 6
5. Measurement equipment 7
6. Antenna Requirement 8
7. DTS bandwidth & 99% bandwidth measurement 9
8. Maximum peak conducted output power 17
9. Peak power spectral density 23
10. Transmitter radiated spurious emissions and conducted spurious emissions 29
11. AC Conducted power line test 45

1. Applicant Information

1.1. Details of applicant

Applicant	:	NTT SONORITY, Inc.
Address	:	3-20-2, Nishishinjuku, Shinjuku-ku, Tokyo 163-1432, Japan
Contact Person	:	Akira Nakagawa
Telephone	:	+81-80-8231-5126
Fax	:	-

1.2. Manufacturer Information

Manufacturer	:	KH ELECTRON PHILS. CORP
Address	:	5416 Claro M. Recto Highway, Clark Freeport Zone, Pampanga, Philippines

2. Laboratory Information

Company name	:	DEKRA Korea Co., Ltd.
Test site number	:	FCC (KR0151), IC (24841)
Address	:	498-2, Geumeo-ro, Pogok-eup, Cheoin-gu, Yongin-si, Gyeonggi-do, 17030, Rep. of Korea
Web site	:	http://www.dekra.kr
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3. Summary of test results

The EUT has been tested according to the following specifications:

FCC Rule FCC part 15	Description	Result
15.203 15.247(b)(4)	Antenna requirement	C
15.247(a)(2)	DTS Bandwidth & 99 % bandwidth	C
15.247(b)(3)	Maximum peak conducted output power	C
15.247(e)	Peak Power Spectral Density	C
15.205(a) 15.209(a) 15.247(d)	Transmitter radiated spurious emissions, Conducted spurious emission	C
15.207(a)	AC Conducted power line test	C

※ Abbreviation

C Complied
N/A Not applicable
F Fail

The sample was tested according to the following specification:
FCC Parts 15.247; ANSI C63.4:2014, ANSI C63.10:2020
FCC Public Notice KDB 558074 D01 v05r02

Approval Signatories

Test and Report Completed by :	Report Approval by :
오 창석	진 [illegible]
David Oh Test Engineer DEKRA Korea Co., Ltd.	Isaac Jin Technical Manager DEKRA Korea Co., Ltd.

The above test certificate is a test report not related to the Korean Laboratory Accreditation Scheme

4. EUT Description

Kind of product	Bluetooth Headphones
Model Name	MBN001
Variant Model Name	MBN001BA, MBN001CA
FCC ID	2A58O-MBN001
IC Number	-
Power supply	DC 3.70 V
Frequency range	2 402 MHz ~ 2 480 MHz
Modulation technique	GFSK
Number of channels	40 ch
Antenna gain / Type	-0.14 dBi / Chip Antenna
Test Site Registration Number	FCC (KR0151), IC (24841)
H/W version / S/W version	1.0 / 1.0
Test S/W version	5.2.3.37(RTLBTAPP)

4.1. Table for Test Modes and Frequency

The following table is a list of the test modes shown in this test report.

Mode	Data rate	Frequency (Freq. MHz)
Bluetooth LE	1 Mbps	**Lowest** (2 402) / **Middle** (2 440) / **Highest** (2 480)
Bluetooth LE	2 Mbps	**Lowest** (2 402) / **Middle** (2 440) / **Highest** (2 480)

5. Measurement equipment

Equipment	Manufacturer	Model	Serial number	Calibration Interval	Calibration date	Calibration due.
Test Receiver	R&S	ESVS30	829673/015	1 year	2022-11-23	2023-11-23
Signal Generator	R&S	SMB100A	178128	1 year	2023-05-17	2024-05-17
Spectrum Analyzer	R&S	FSVA40	101591	1 year	2023-03-16	2024-03-16
DC Power Supply	R&S	NGE100	102415	1 year	2023-05-16	2024-05-16
Power Sensor	R&S	NRP-Z85	102464	1 year	2023-05-16	2024-05-16
Horn Antenna	R&S	HF906	100236	2 year	2023-06-20	2024-06-20
Horn Antenna	AH Systems	SAS-572	269	1 year	2023-05-22	2024-05-22
Horn Antenna	AH Systems	SAS-573	164	1 year	2023-05-22	2024-05-22
Bi-Log Ant.	S/B	VULB 9161SE	4159	2 year	2022-03-21	2024-03-21
Loop Antenna	ETS LINDGREN	6502	00118166	2 year	2022-05-25	2024-05-25
Power Amplifier	TESTEK	TK-PA18H	170013-L	1 year	2023-05-16	2024-05-16
Power Amplifier	MITEQ	AFS43-01002600	2048519	1 year	2023-05-19	2024-05-19
Power Amplifier	MITEQ	AMF-6F-26004000-33-8P-HS	1511665	1 year	2023-05-19	2024-05-19
Controller	INNCO	CO2000	CO2000/064/6961003/L	N/A	N/A	N/A
Antenna Master	INNCO	MA4000	MA4000/038/6961003/L	N/A	N/A	N/A
Controller	INNCO	CO3000	CO3000/812/34240914/L	N/A	N/A	N/A
Antenna Master	INNCO	MA4640-XP-ET	None	N/A	N/A	N/A
RF Cable	SUHNER	SUCOFLEX100	84047746	3 month	2023-06-21	2023-09-21
RF Cable	SUHNER	SUCOFLEX102	801270/2	3 month	2023-06-21	2023-09-21
RF Cable	SUHNER	SUCOFLEX102	801532/2	3 month	2023-06-21	2023-09-21
Band Rejection Filter	Micro-Tonics	BRM50702	064	1 year	2023-05-16	2024-05-16
Test Receiver	R&S	ESR3	101873	1 year	2023-05-16	2024-05-16
Pulse Limiter	R&S	ESH3-Z2	100288	1 year	2023-05-17	2024-05-17
Two Line-V-Network	R&S	ESH3-Z5	100296	1 year	2022-11-23	2023-11-24
Power Divider	HP	11636B	12481	1 year	2023-05-19	2024-05-19

※Remark

Support equipment

Description	Manufacturer	Model	Serial number
Notebook computer	DELL	E5440	8HCMN12

6. Antenna Requirement

6.1. Standard applicable

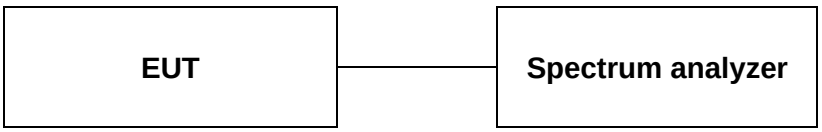
For intentional device, according to FCC 47 CFR Section §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section §15.247 (c) if transmitting antennas of directional gain greater than 6 dBi are used.

6.2. Antenna connected construction

Antenna used in this product is Chip antenna,
Antenna gain is -0.14 dBi.

7. DTS bandwidth & 99% bandwidth measurement

7.1. Test setup



7.2. Limit

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902~928 MHz, 2 400~2 483.5 MHz, and 5 725~5 825 MHz bands. The minimum of 6 dB Bandwidth shall be at least 500 kHz

7.3. Test procedure

DTS bandwidth & 99% bandwidth is measured using the following procedure
1. Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz
2. Set the VBW ≥ 3 x RBW.
3. Detector = peak
4. Trace mode = max hold
5. Sweep time = No faster than coupled(auto) time.
6. Allow trace to fully stabilize
7. Measure the maximum width of the emission by placing two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "-6 dB down amplitude". If a marker is below this "-6 dB down amplitude" value, then it shall be as close as possible to this value.

7.4. Test results

Test mode : Bluetooth LE (1 Mbps)

Frequency(MHz)	6 dB bandwidth(MHz)	99% bandwidth(MHz)
2 402	0.65	1.03
2 440	0.65	1.03
2 480	0.65	1.02

Test mode : Bluetooth LE (2 Mbps)

Frequency(MHz)	6 dB bandwidth(MHz)	99% bandwidth(MHz)
2 402	1.37	2.06
2 440	1.26	1.89
2 480	1.12	1.68

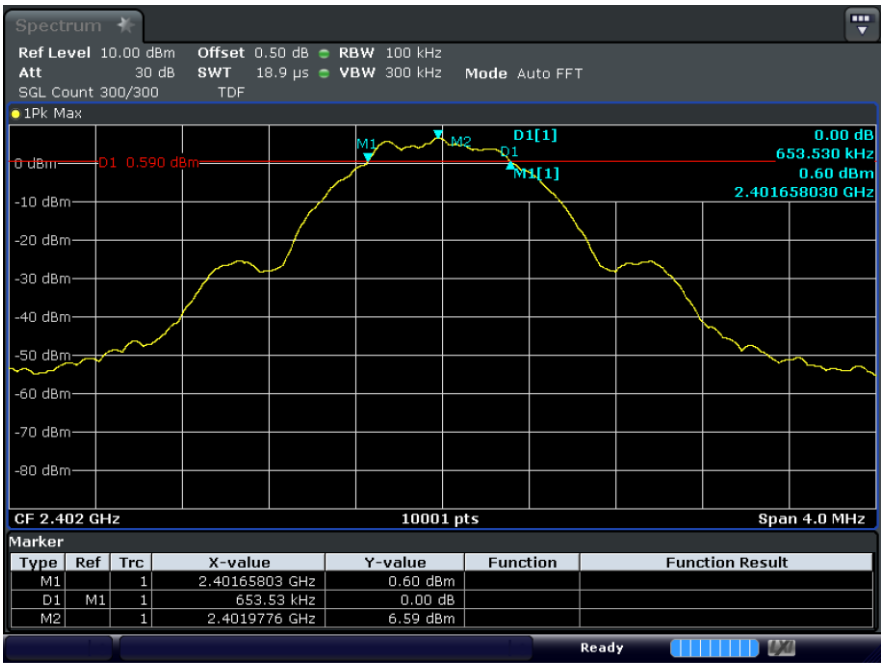
※Remark

1. These results are satisfied in accordance with decision rules, including measurements and estimates of measurement uncertainty

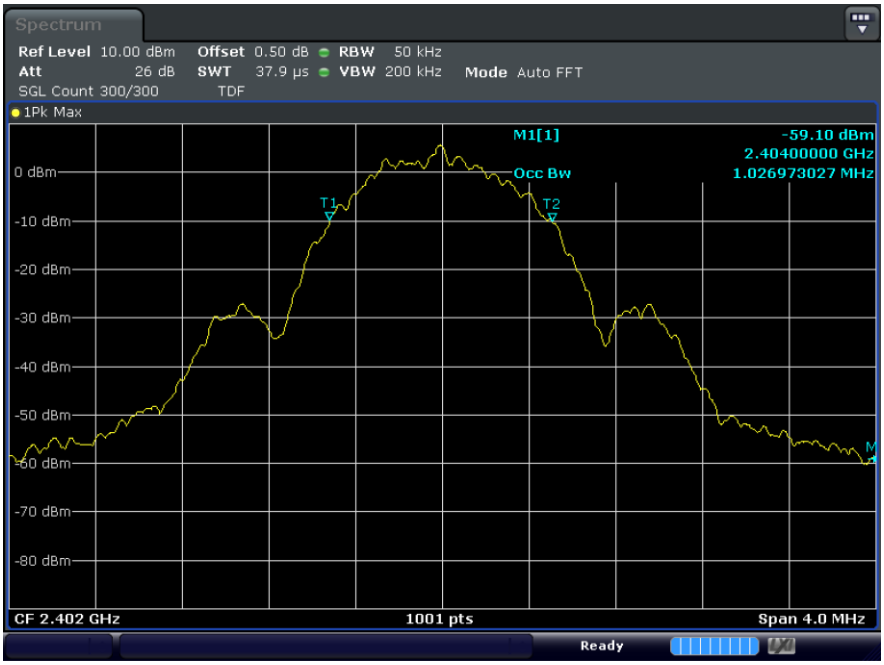
7.4.1. Test plot

Test mode : Bluetooth LE (1 Mbps)

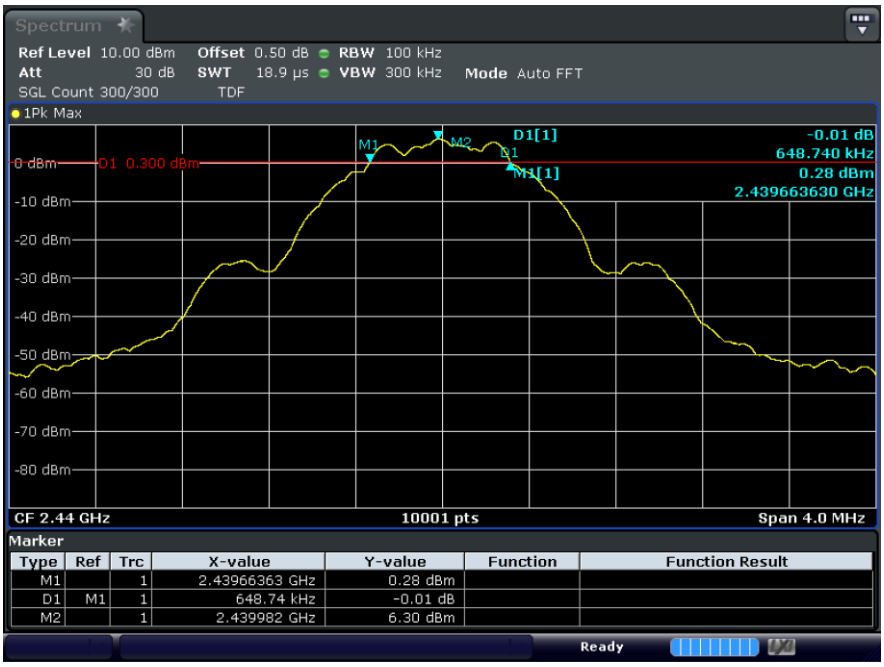
A.1. Lowest Ch. (2 402 MHz)_6dB Bandwidth



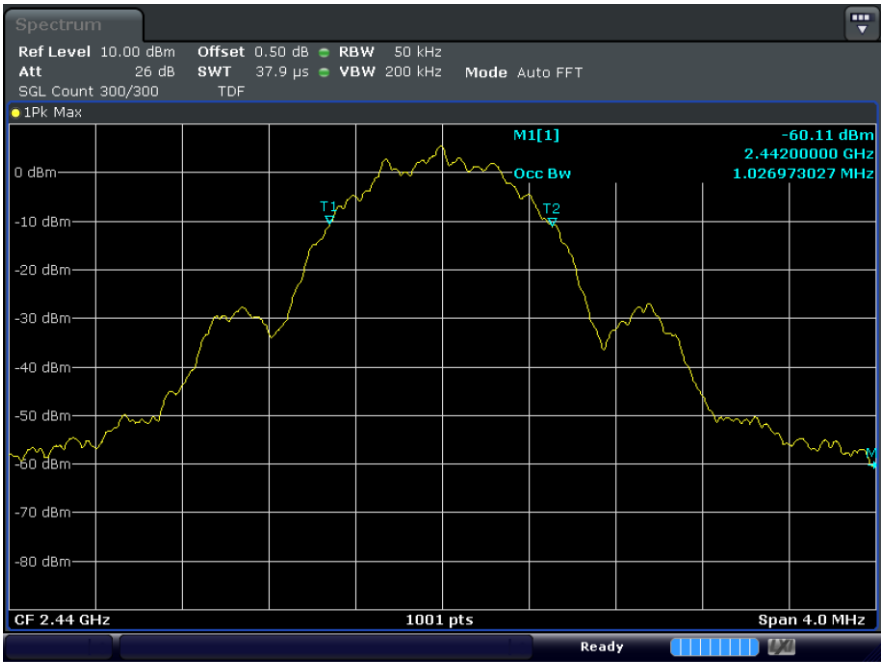
A.2. Lowest Ch. (2 402 MHz)_99% Bandwidth



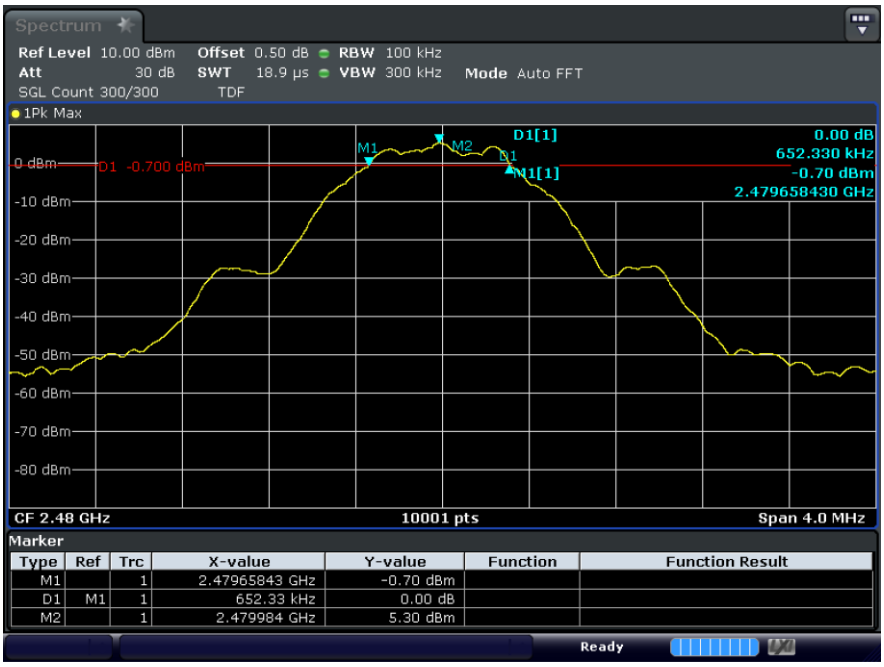
B.1. Middle Ch. (2 440 MHz)_6dB Bandwidth



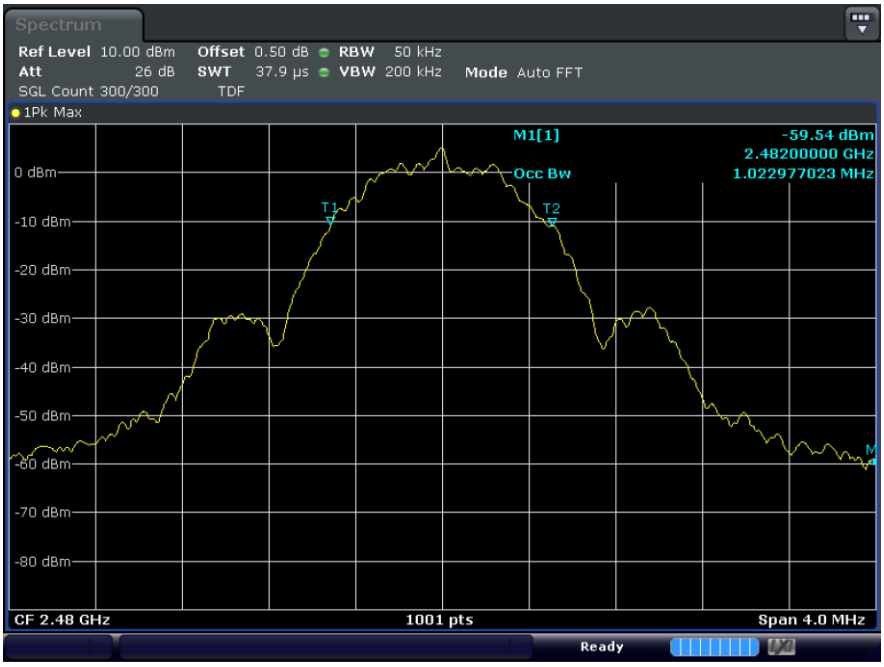
B.2. Middle Ch. (2 440 MHz)_99% Bandwidth



C.1. Highest Ch. (2 480 MHz)_6dB Bandwidth

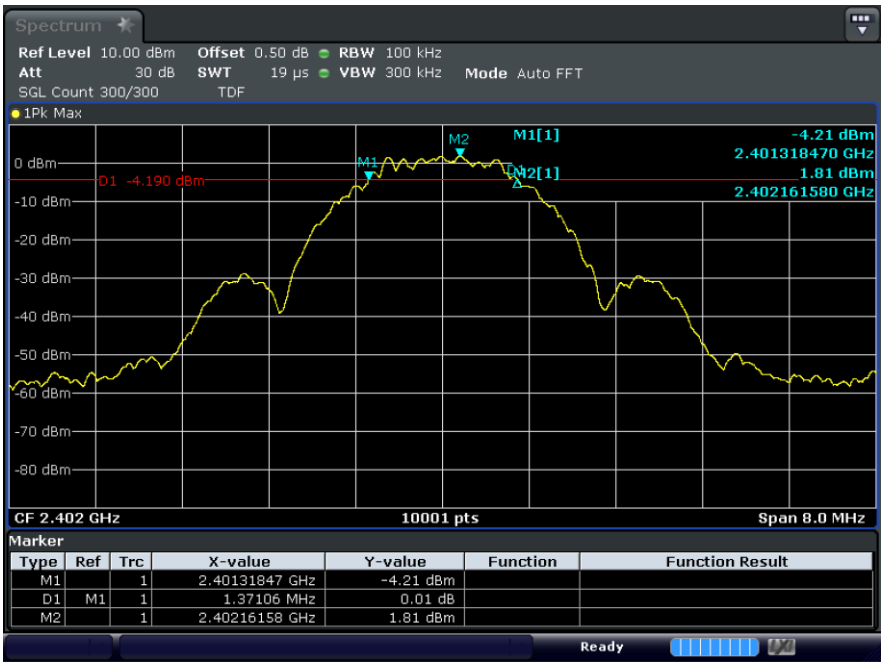


C.2. Highest Ch. (2 480 MHz)_99% Bandwidth

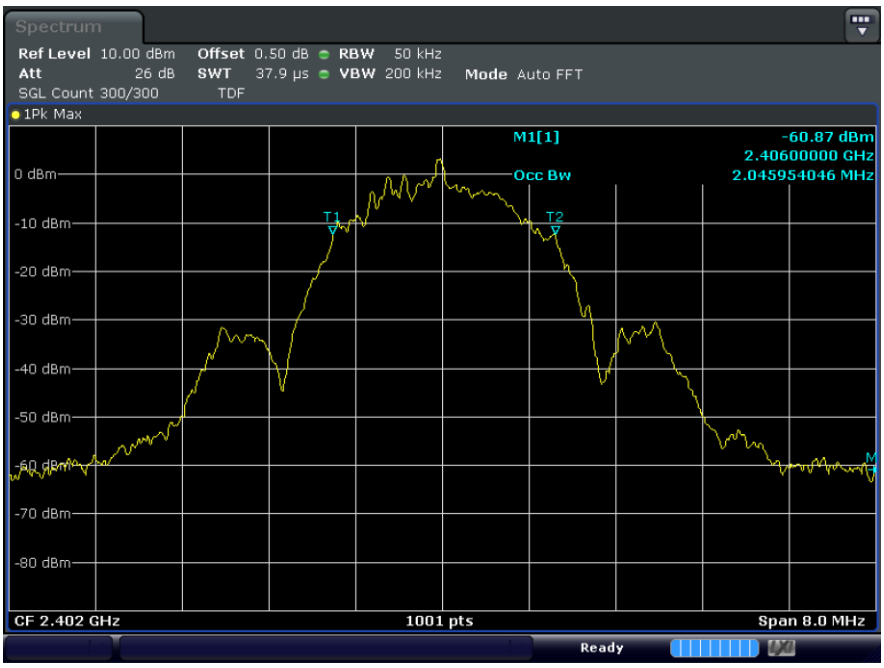


Test mode : Bluetooth LE (2 Mbps)

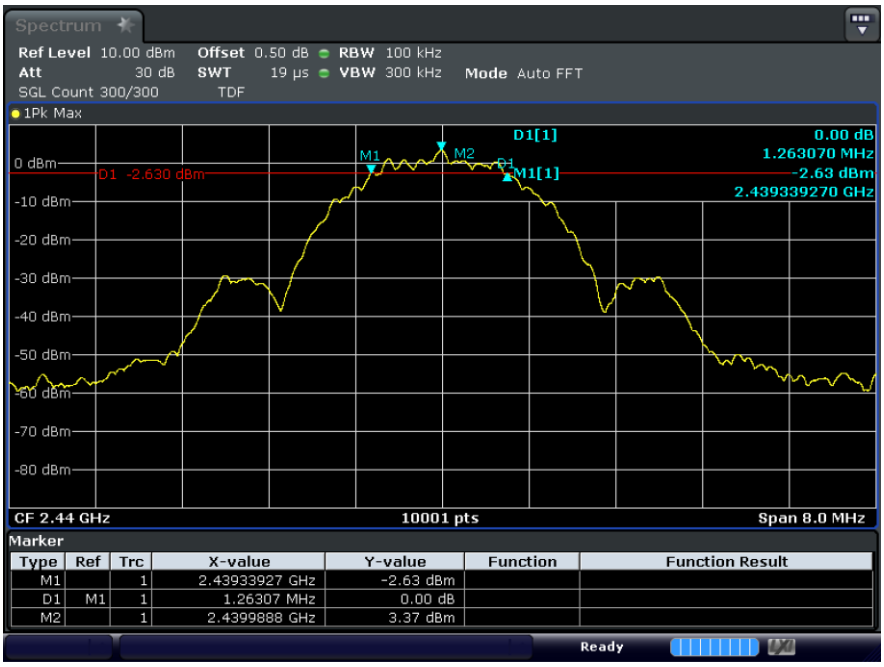
A.1. Lowest Ch. (2 402 MHz)_6dB Bandwidth



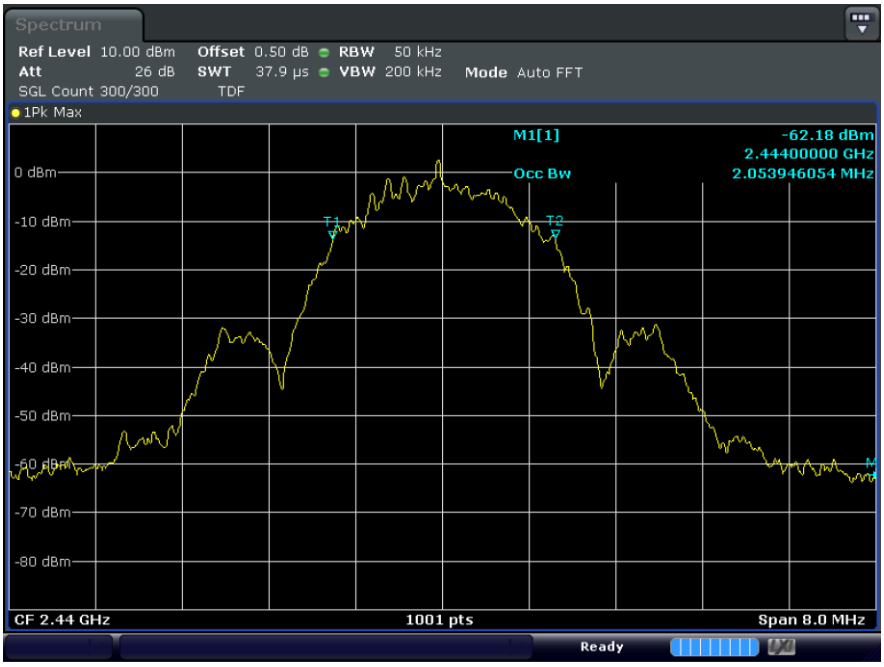
A.2. Lowest Ch. (2 402 MHz)_99% Bandwidth



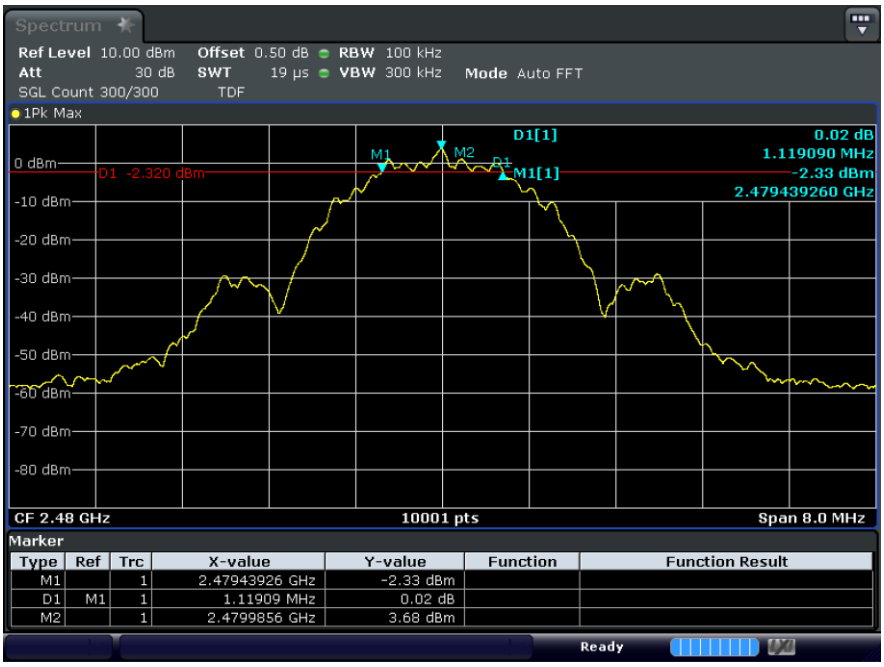
B.1. Middle Ch. (2 440 MHz)_6dB Bandwidth



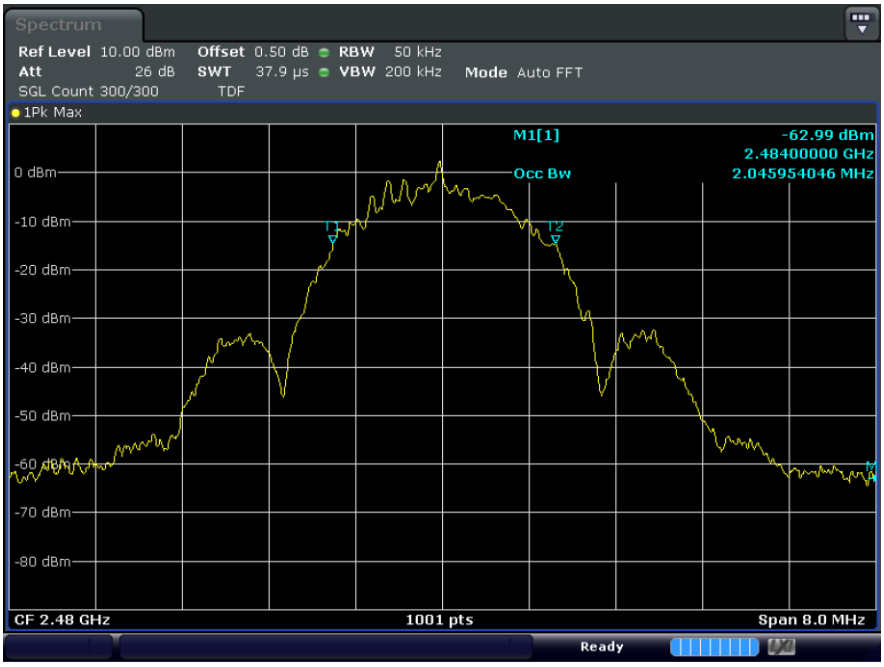
B.2. Middle Ch. (2 440 MHz)_99% Bandwidth



C.1. Highest Ch. (2 480 MHz)_6dB Bandwidth

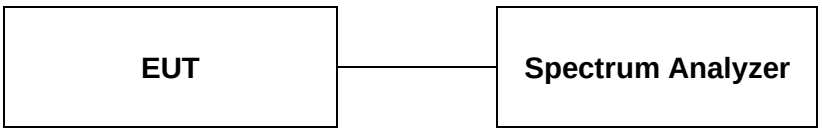


C.2. Highest Ch. (2 480 MHz)_99% Bandwidth



8. Maximum peak conducted output power

8.1. Test setup



8.2. Limit

The maximum peak output power of the intentional radiator shall not exceed the following:
1. §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 6 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW
2. §15.247(b)(1), For frequency hopping systems operating in the 2400–2483.5 MHz employing at least 75non-overlapping hopping channels, and all frequency hopping systems in the 5725–5 805 MHz band: 1Watt.

8.3. Test procedure

Maximum Peak Conducted Output Power is measured using the following procedure (RBW ≥ DTS bandwidth).
1. Set the RBW ≥ DTS bandwidth.
2. Set VBW ≥ 3 x RBW.
3. Set Span ≥ 3 x RBW.
4. Sweep time = No faster than coupled(auto) time.
5. Detector = peak
6. Trace mode = max hold
7. Allow trace to fully stabilize
8. Use peak marker function to determine the peak amplitude level.

8.4. Test results

Test mode : Bluetooth LE (1 Mbps)

Frequency(MHz)	Conducted power (dBm)	Limit (dBm)
2 402	6.59	30.00
2 440	6.37	
2 480	5.78	

Test mode : Bluetooth LE (2 Mbps)

Frequency(MHz)	Conducted power (dBm)	Limit (dBm)
2 402	4.97	30.00
2 440	5.18	
2 480	4.84	

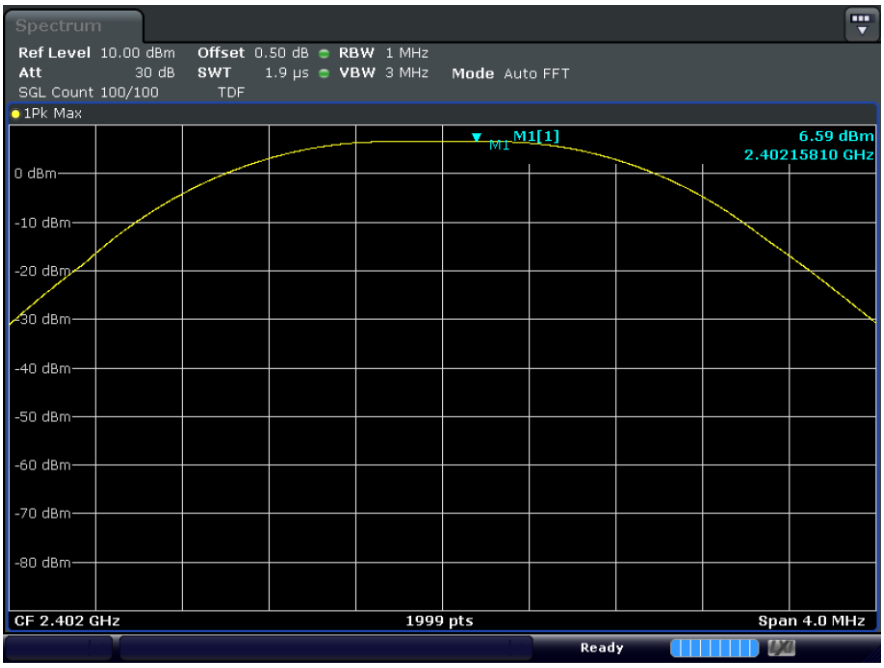
※Remark

1. These results are satisfied in accordance with decision rules, including measurements and estimates of measurement uncertainty

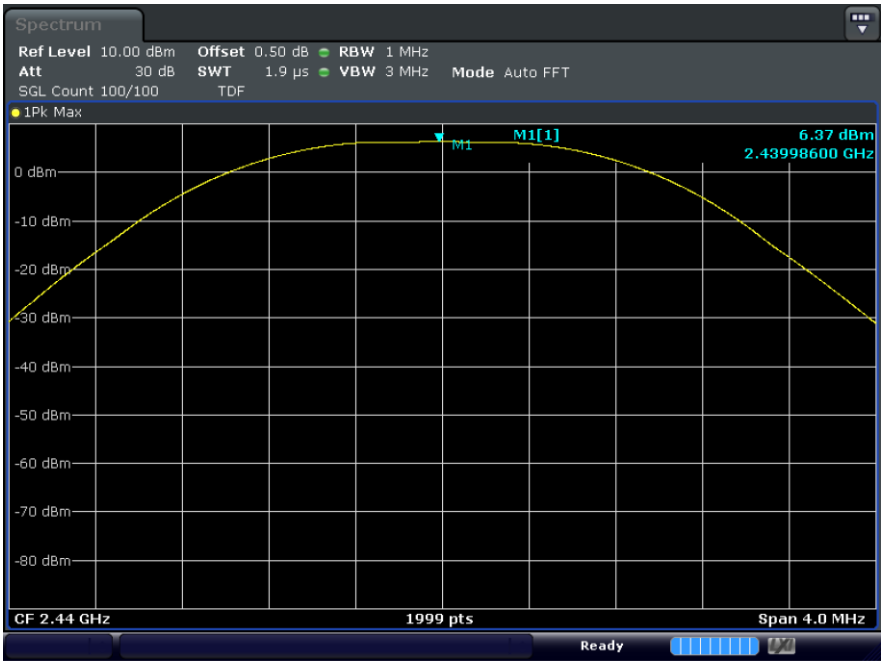
8.4.1. Test plot

Test mode : Bluetooth LE (1 Mbps)

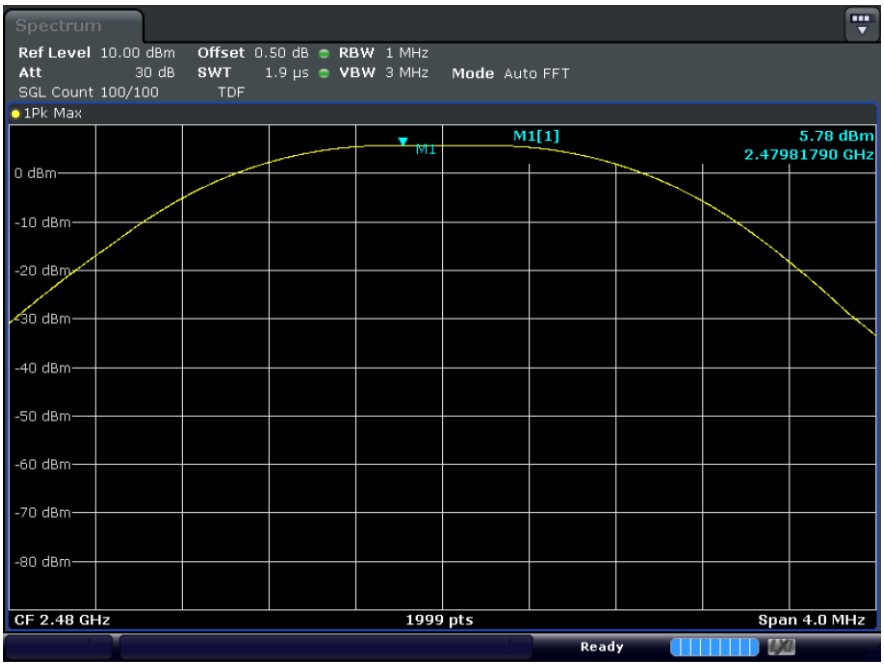
A. Lowest Ch. (2 402 MHz)



B. Middle Ch. (2 440 MHz)

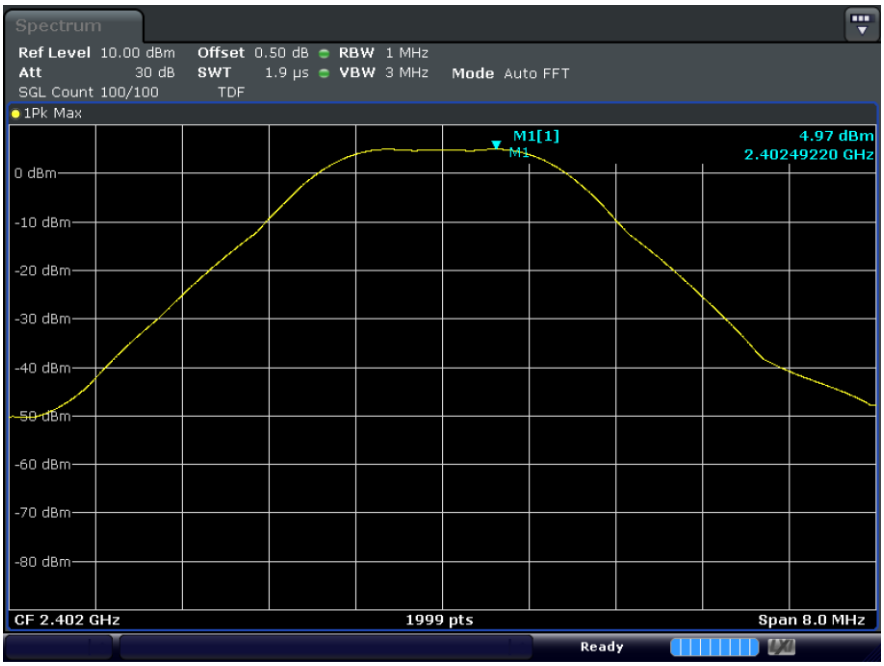


C. Highest Ch. (2 480 MHz)

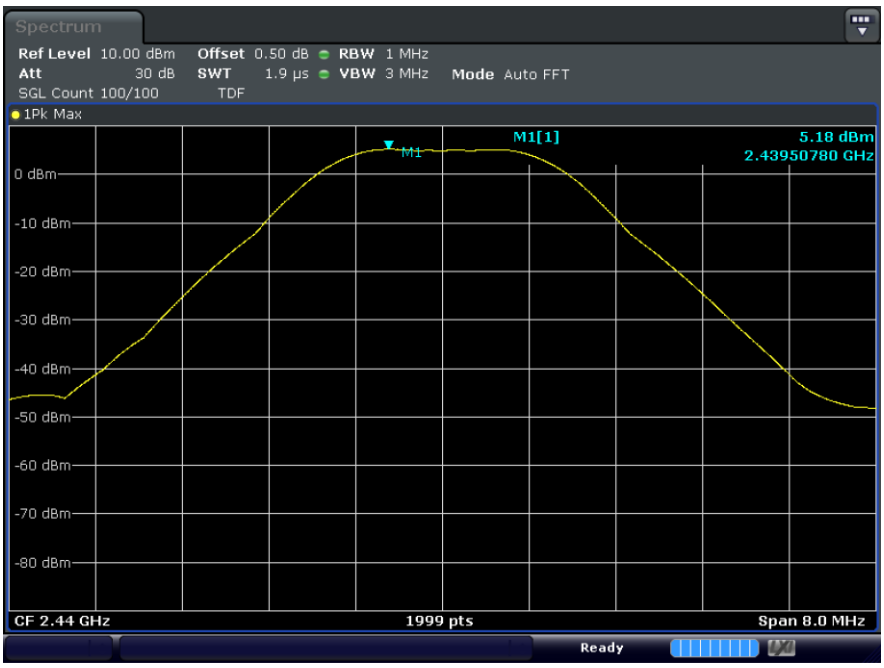


Test mode : Bluetooth LE (2 Mbps)

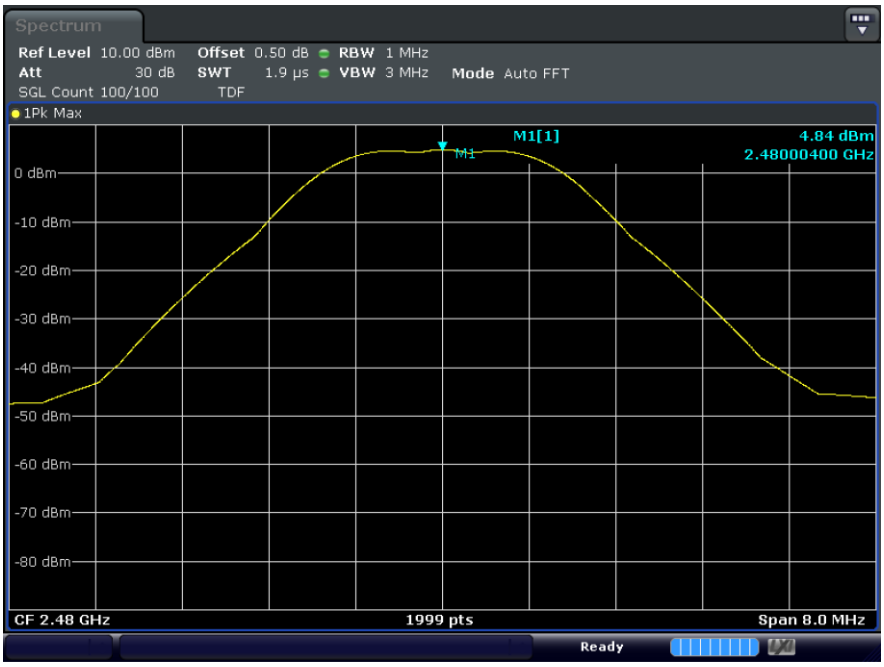
A. Lowest Ch. (2 402 MHz)



B. Middle Ch. (2 440 MHz)

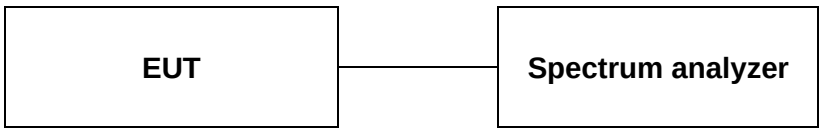


C. Highest Ch. (2 480 MHz)



9. Peak power spectral density

9.1. Test setup



9.2. Limit

< 8 dBm @ 3 kHz BW

9.3. Test procedure (PKPSD)

Peak power spectral density is measured using the following procedure
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the Span > 1.5 times the DTS bandwidth.
3. Set the RBW = 3 kHz ≤ RBW ≤ 100 kHz
4. Set the ≥ 3 x RBW
5. Detector = peak
6. Trace mode = Max hold
7. Allow trace to fully stabilize
8. Use the peak marker function to determine the maximum amplitude level within the RBW.
9. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

9.4. Test results

Test mode : Bluetooth LE (1 Mbps)

Frequency(MHz)	Power spectral density(dBm)	Limit (dBm)
2 402	-9.79	8.00
2 440	-8.23	
2 480	-9.04	

Test mode : Bluetooth LE (2 Mbps)

Frequency(MHz)	Power spectral density(dBm)	Limit (dBm)
2 402	-12.64	8.00
2 440	-11.66	
2 480	-13.73	

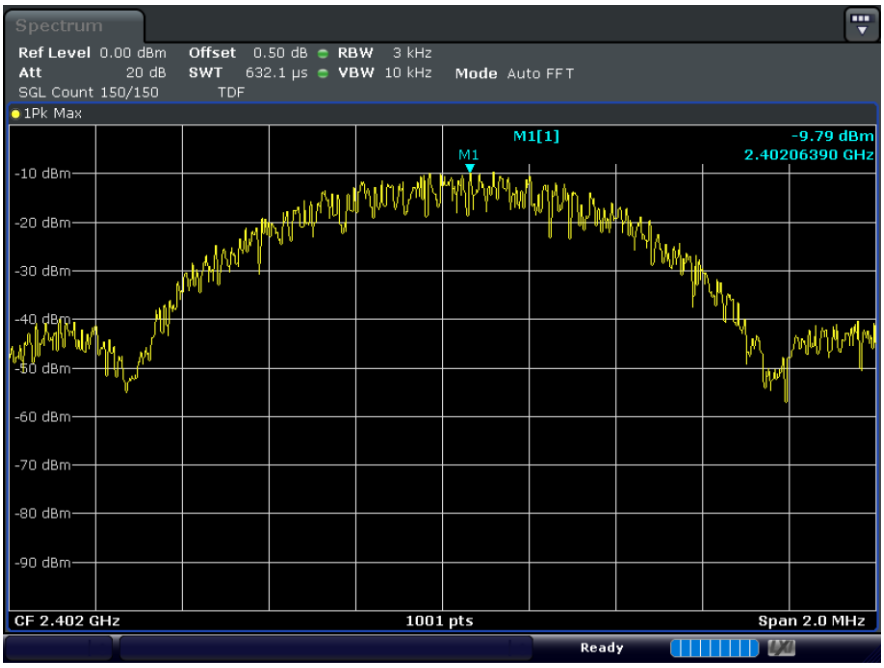
※Remark

1. These results are satisfied in accordance with decision rules, including measurements and estimates of measurement uncertainty

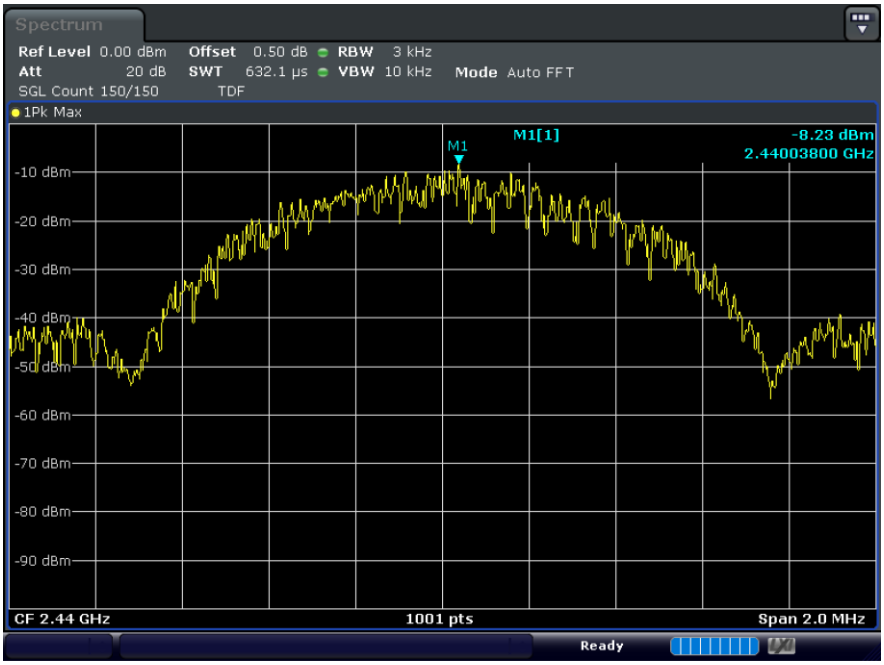
9.4.1. Test plot

Test mode : Bluetooth LE (1 Mbps)

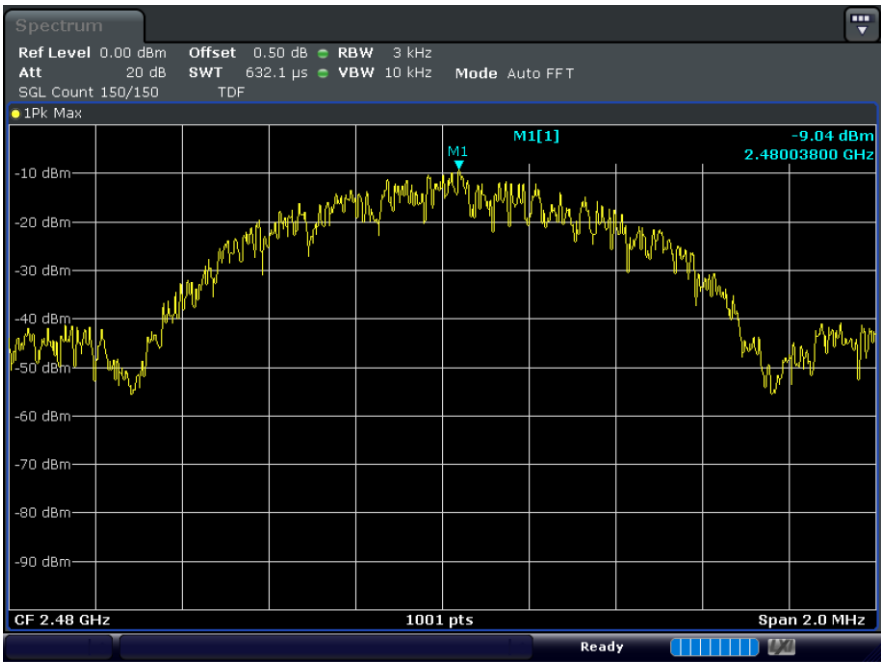
A. Lowest Ch. (2 402 MHz)



B. Middle Ch. (2 440 MHz)

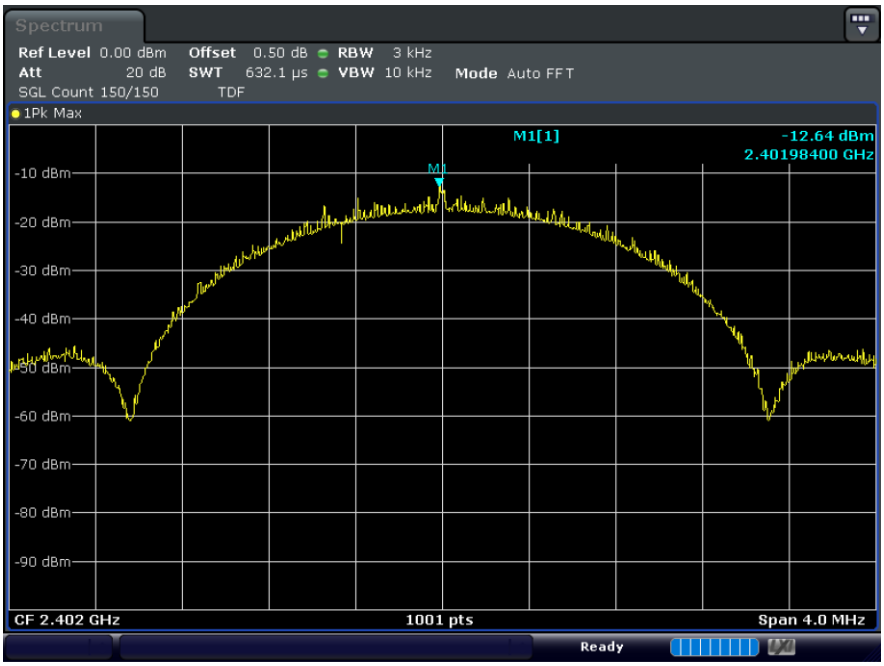


C. Highest Ch. (2 480 MHz)

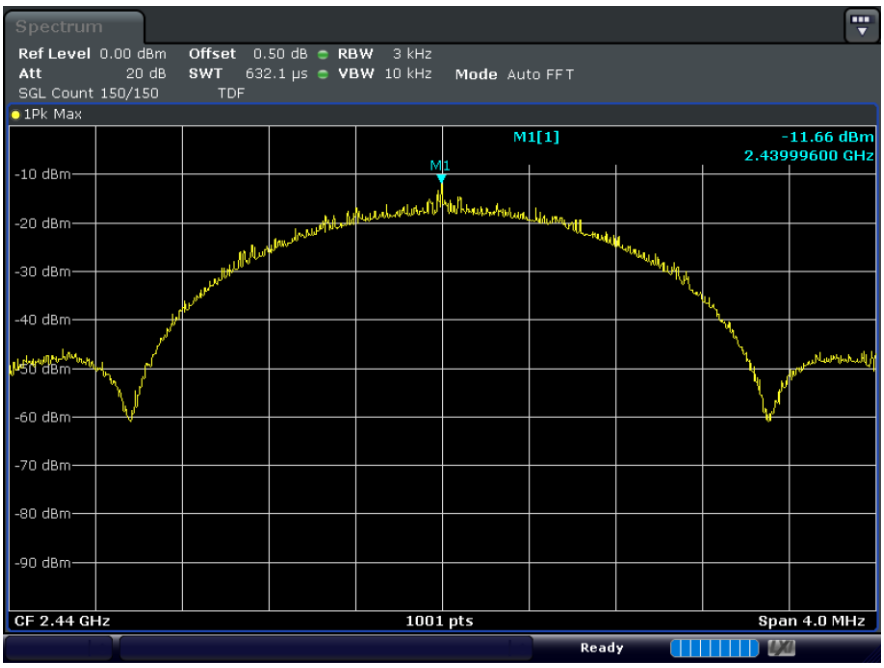


Test mode : Bluetooth LE (2 Mbps)

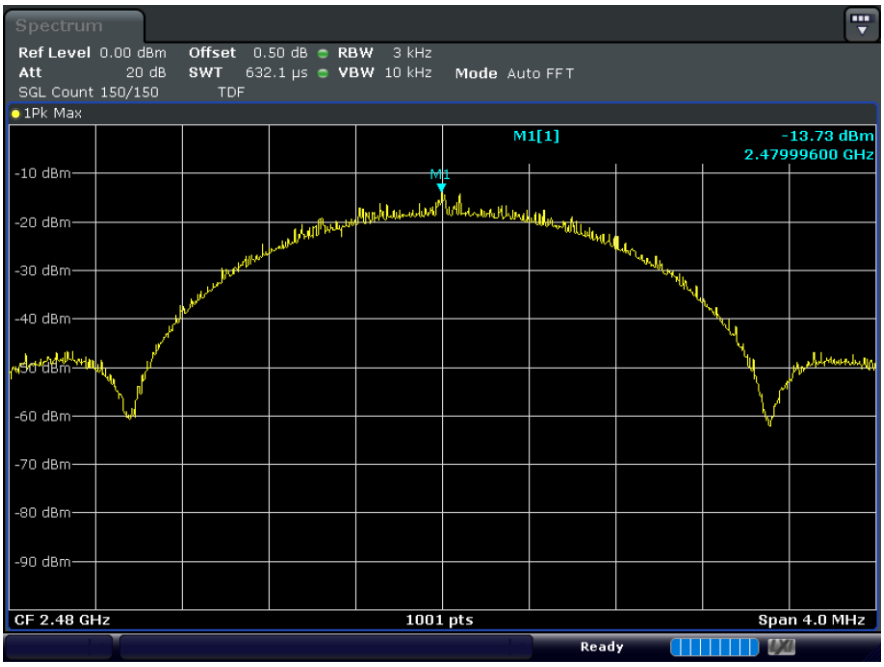
A. Lowest Ch. (2 402 MHz)



B. Middle Ch. (2 440 MHz)



C. Highest Ch. (2 480 MHz)

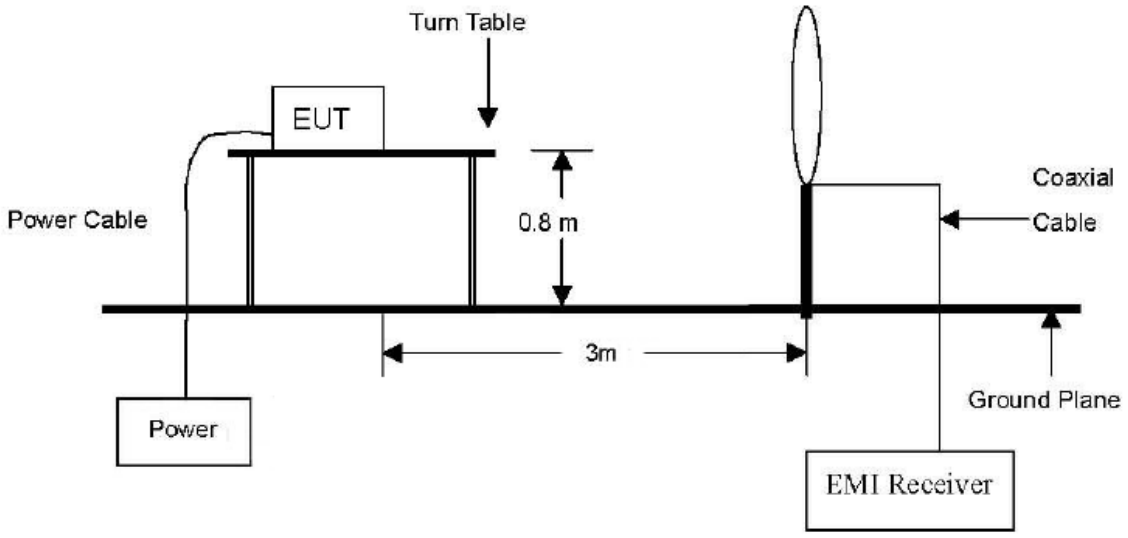


10. Transmitter radiated spurious emissions and conducted spurious emissions

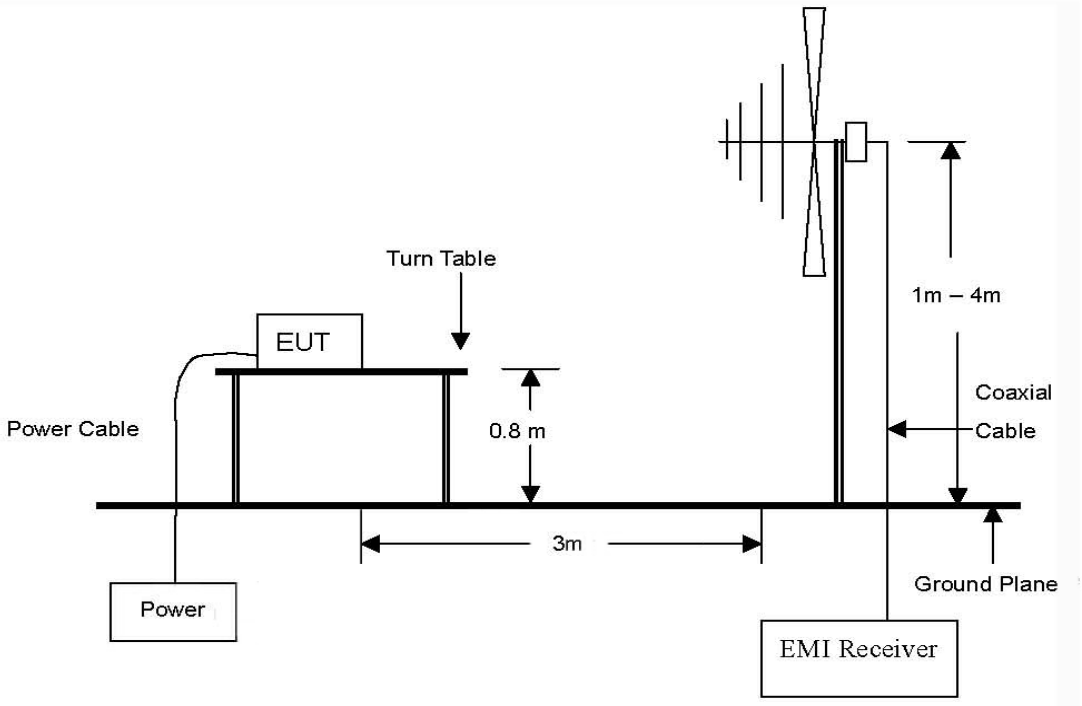
10.1. Test setup

10.1.1. Transmitter radiated spurious emissions

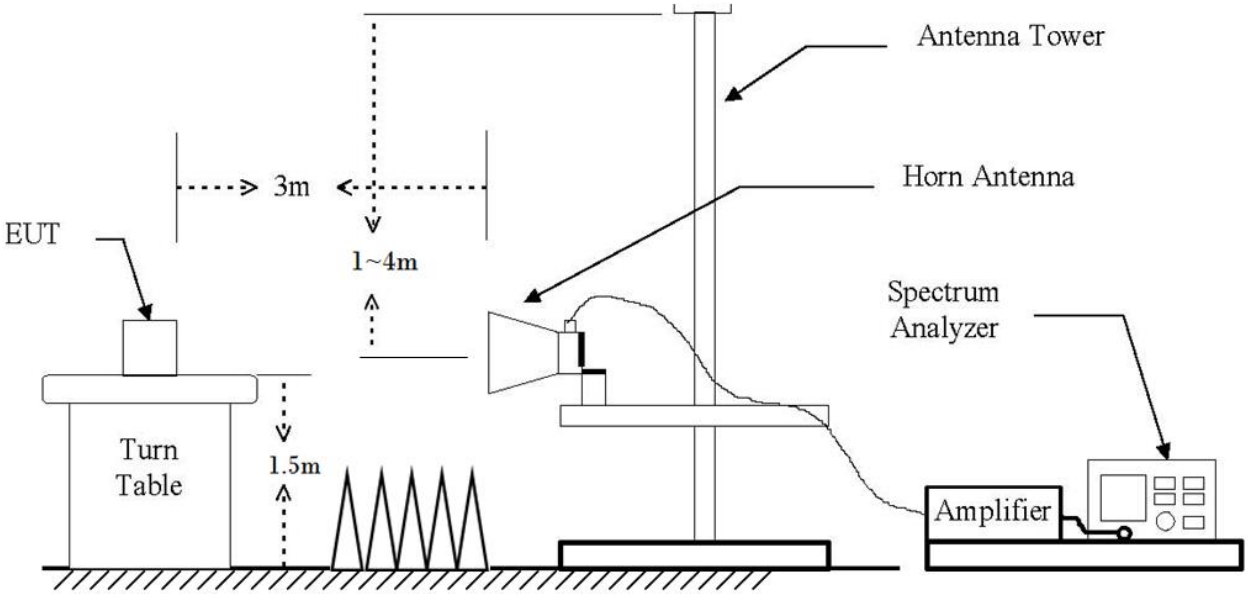
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 40 GHz emissions.



10.2. Limit

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval , as permitted under paragraph(b)(3) of this section , the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in section §15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.209(a) (see section §15.205(c))
According to § 15.209(a), for an intentional radiator devices, the general required of field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

Frequency (MHz)	Distance (Meters)	Radiated at 3M (dBuV/m)	Radiated (uV/m)
0.009–0.490	300	See the remark	2400/F(kHz)
0.490–1.705	30		24000/F(kHz)
1.705–30.0	30		30
30 - 88	3	40.0	100
88 – 216	3	43.52	150
216 – 960	3	46.02	200
Above 960	3	53.97	500

※Remark

1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor =20log(Specific distance/ test distance)(dB)
   Limit line=Specific limits(dBuV) + distance extrapolation factor.

10.3. Test procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.10:2020
In case of the air temperature of the test site is out of the range is 10 to 40 °C before the testing proceeds the warm-up time of EUT maintain adequately

10.3.1. Test procedures for radiated spurious emissions

1. The EUT is placed on a turntable, which is 0.8 m (Below 1 GHz.)/ 1.5 m (Above 1GHz) above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

※Remark

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10 kHz for Peak detection (PK) at frequency below 30 MHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Peak detection (PK) or Quasi-peak detection (QP) at frequency below 1 GHz.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1 GHz.

10.3.2. Test procedures for conducted spurious emissions

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW=100 kHz, VBW=100 kHz.

10.4. Test results

10.4.1. Radiated spurious emissions (9 kHz to 30 MHz)

The frequency spectrum from 9 kHz to 30 MHz was investigated. Emission levels are not reported much lower than the limits by over 20 dB. All reading values are peak values.
To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Test mode : Bluetooth LE (1 Mbps)_2 480 MHz (Worst case)

Frequency (MHz)	Detector Mode	Pol.	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
No other emissions were detected at a level greater than 20dB below limit.					

※Remark

1. Actual = Reading + Ant. factor - Amp + CL (Cable loss)
2. 15.31 Measurement standards.
The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.
3. These results are satisfied in accordance with decision rules, including measurements and estimates of measurement uncertainty

10.4.2. Radiated spurious emissions (30 MHz to 1 000 MHz)

The frequency spectrum from 30 MHz to 1 000 MHz was investigated. Emission levels are not reported much lower than the limits by over 20 dB. All reading values are peak values.
To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Test mode : Bluetooth LE (1 Mbps)_2 480 MHz (Worst case)

Frequency (MHz)	Detector Mode	Pol.	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
34.32	QP	V	21.50	40.00	18.50
93.54	QP	H	26.70	43.50	16.80
634.27	QP	V	26.30	46.00	19.70
729.37	QP	V	28.90	46.00	17.10
831.53	QP	V	33.70	46.00	12.30
Above 600 MHz Not detected					

※Remark

1. Actual = Reading + Ant. factor - Amp + CL (Cable loss)
2. 15.31 Measurement standards.
The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.
3. These results are satisfied in accordance with decision rules, including measurements and estimates of measurement uncertainty

10.4.3. Radiated spurious emissions & Bandedge (Above 1 000 MHz)

The frequency spectrum above 1 000 MHz was investigated. Emission levels are not reported much lower than the limits by over 20 dB.
To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

Test mode : Bluetooth LE (1 Mbps)

A. Lowest Ch. (2 402 MHz)

Frequency (MHz)	Detector Mode	Pol.	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
*2 389.20	Peak	V	38.21	74.00	35.79
*4 802.19	Peak	H	38.93	74.00	35.07
Above 5 000 MHz Not detected					

B. Middle Ch. (2 440 MHz)

Frequency (MHz)	Detector Mode	Pol.	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
*4 915.80	Peak	H	36.65	74.00	37.35
Above 5 000 MHz Not detected					

※Remark

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental Frequency.
2. Radiated emissions measured in frequency above 1 000 MHz were made with an instrument using peak/average detector mode.
3. Actual = Reading + Ant. factor - Amp + CL (Cable loss) + DCCF
4. 15.31 Measurement standards.
The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.
5. * is Restricted band.
6. DCCF(Duty Cycle Correction Factor) = 20 x Log(Worst case dwell time / 100 ms) dB
7. Average measurement did not take place because the peak data did not exceed average limit
8. These results are satisfied in accordance with decision rules, including measurements and estimates of measurement uncertainty

C. Highest Ch. (2 480 MHz)

Frequency (MHz)	Detector Mode	Pol.	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
*2 483.50	Peak	H	37.38	74.00	36.62
*4 993.49	Peak	V	38.31	74.00	35.69
Above 5 000 MHz Not detected					

※Remark

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental Frequency.
2. Radiated emissions measured in frequency above 1 000 MHz were made with an instrument using peak/average detector mode.
3. Actual = Reading + Ant. factor - Amp + CL (Cable loss) + DCCF
4. 15.31 Measurement standards.
The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.
5. * is Restricted band.
6. DCCF(Duty Cycle Correction Factor) = 20 x Log(Worst case dwell time / 100 ms) dB
7. Average measurement did not take place because the peak data did not exceed average limit
8. These results are satisfied in accordance with decision rules, including measurements and estimates of measurement uncertainty

Test mode : Bluetooth LE (2 Mbps)

A. Lowest Ch. (2 402 MHz)

Frequency (MHz)	Detector Mode	Pol.	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
*2 389.77	Peak	V	36.38	74.00	34.66
*4 802.80	Peak	H	39.15	74.00	34.85
Above 5 000 MHz Not detected					

B. Middle Ch. (2 440 MHz)

Frequency (MHz)	Detector Mode	Pol.	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
*4 859.43	Peak	V	37.71	74.00	36.29
Above 5 000 MHz Not detected					

※Remark

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental Frequency.
2. Radiated emissions measured in frequency above 1 000 MHz were made with an instrument using peak/average detector mode.
3. Actual = Reading + Ant. factor - Amp + CL (Cable loss) + DCCF
4. 15.31 Measurement standards.
The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.
5. * is Restricted band.
6. DCCF(Duty Cycle Correction Factor) = 20 x Log(Worst case dwell time / 100 ms) dB
7. Average measurement did not take place because the peak data did not exceed average limit
8. These results are satisfied in accordance with decision rules, including measurements and estimates of measurement uncertainty

C. Highest Ch. (2 480 MHz)

Frequency (MHz)	Detector Mode	Pol.	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
*2 483.50	Peak	H	41.16	74.00	32.84
*4 989.72	Peak	H	39.13	74.00	34.87
Above 5 000 MHz Not detected					

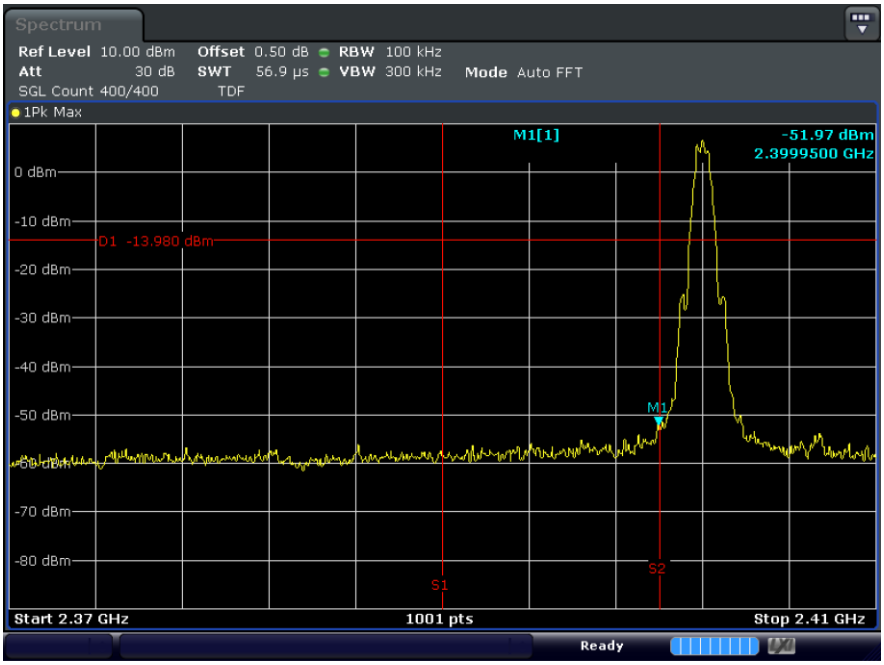
※Remark

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental Frequency.
2. Radiated emissions measured in frequency above 1 000 MHz were made with an instrument using peak/average detector mode.
3. Actual = Reading + Ant. factor - Amp + CL (Cable loss) + DCCF
4. 15.31 Measurement standards.
The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.
5. * is Restricted band.
6. DCCF(Duty Cycle Correction Factor) = 20 x Log(Worst case dwell time / 100 ms) dB
7. Average measurement did not take place because the peak data did not exceed average limit
8. These results are satisfied in accordance with decision rules, including measurements and estimates of measurement uncertainty

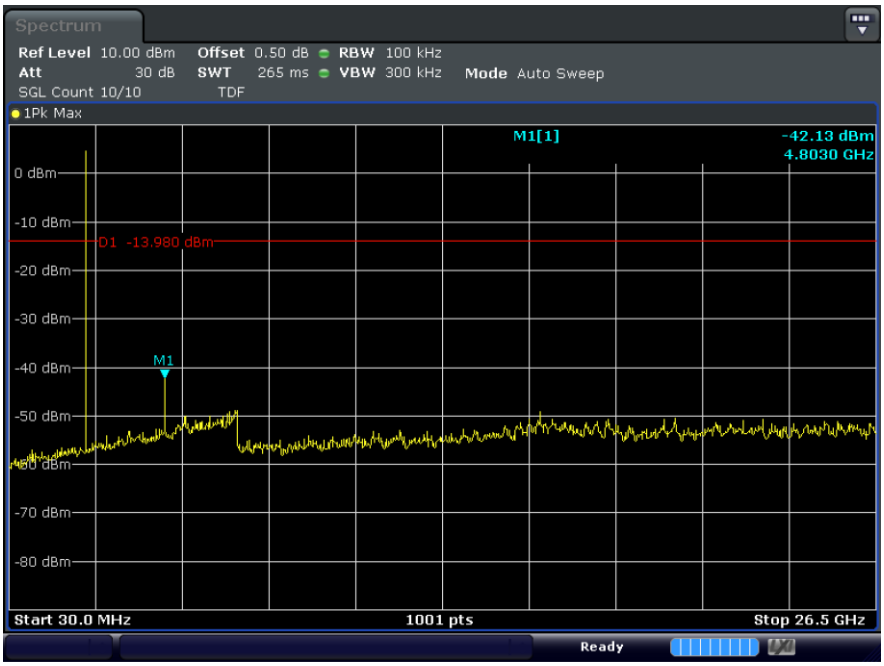
10.4.4. Test plot (Conducted spurious emissions & Bandedge)

Test mode : Bluetooth LE (1 Mbps)

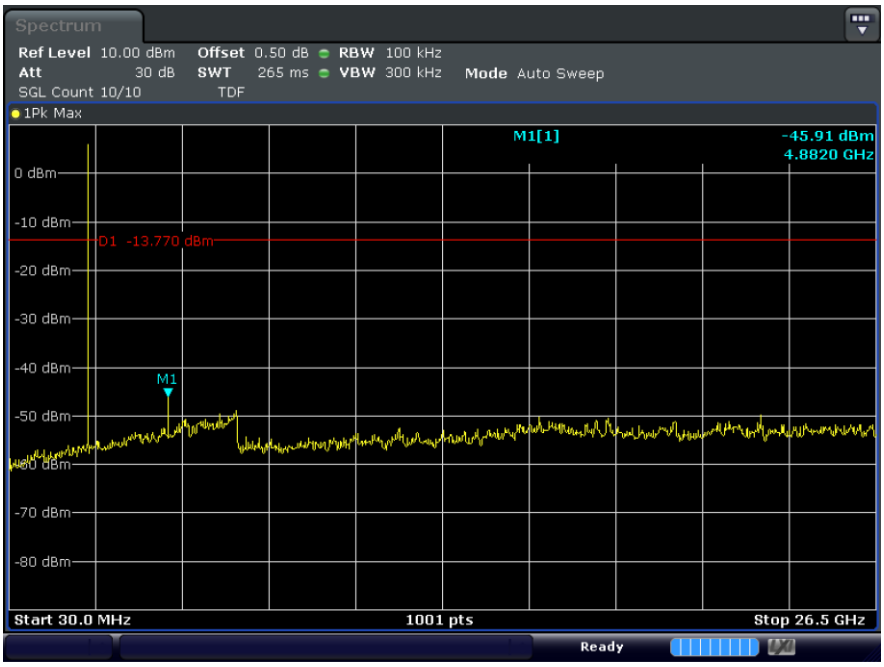
A.1. Lowest Ch. (2 402 MHz)_Band edge



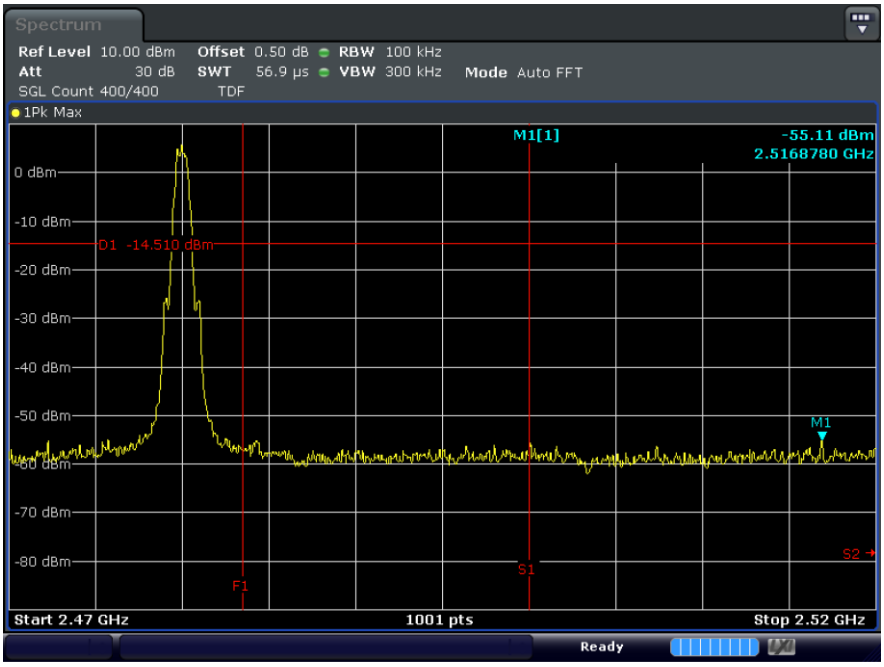
A.2. Lowest Ch. (2 402 MHz)_Spurious emissions



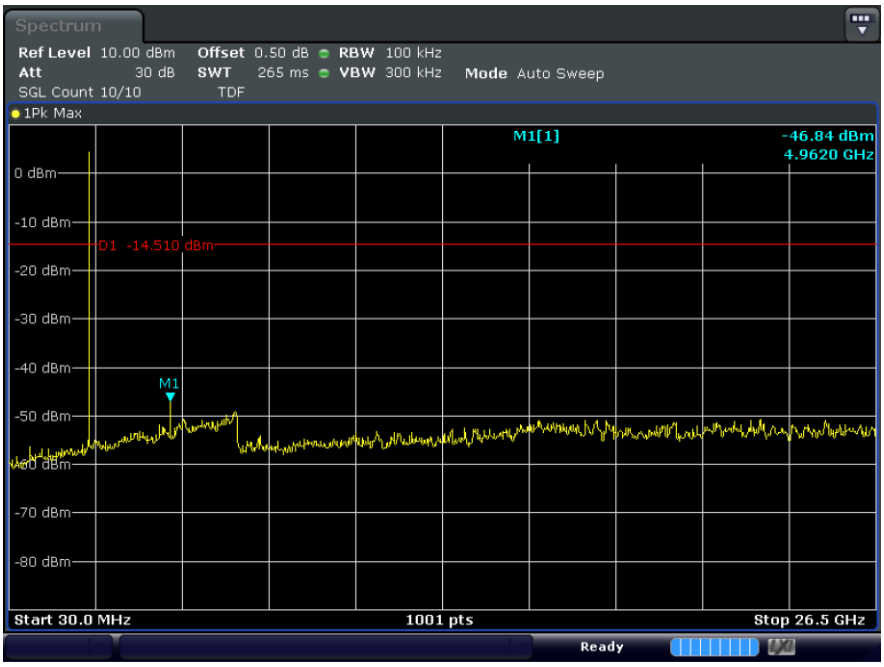
B.1. Middle Ch. (2 440 MHz)_Spurious emissions



C.1. Highest Ch. (2 480 MHz)_ Band edge

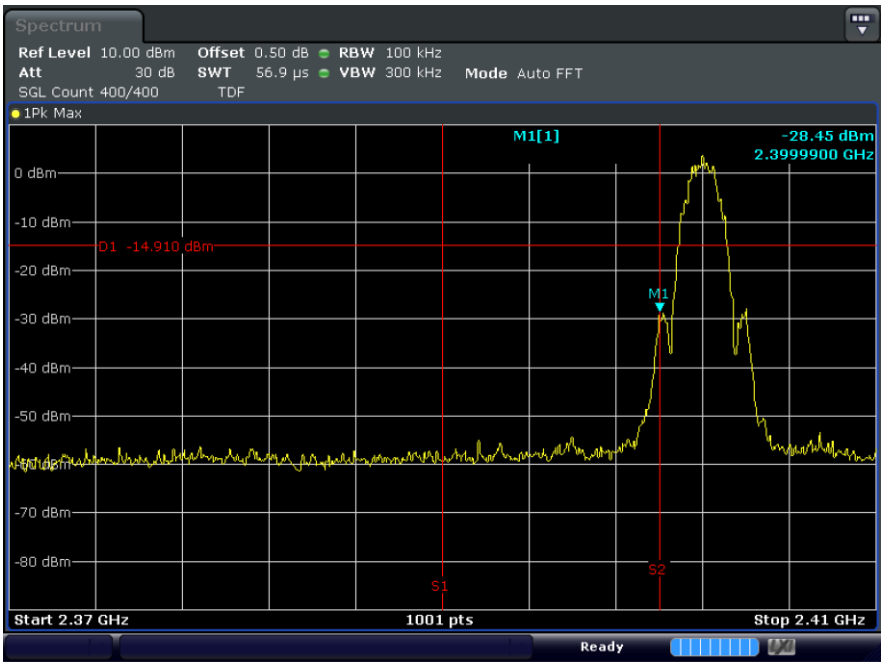


C.2. Highest Ch. (2 480 MHz)_Spurious emissions

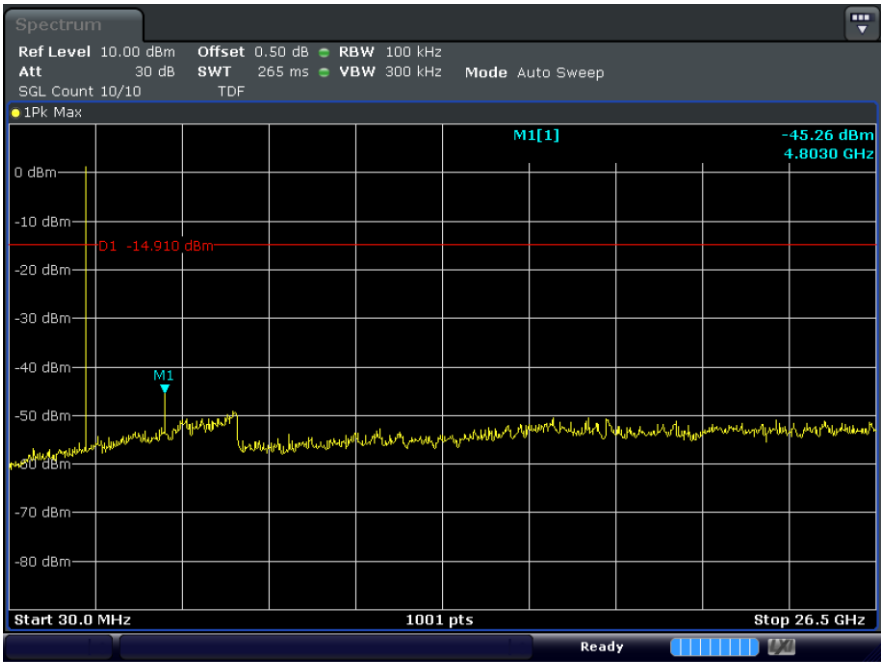


Test mode : Bluetooth LE (2 Mbps)

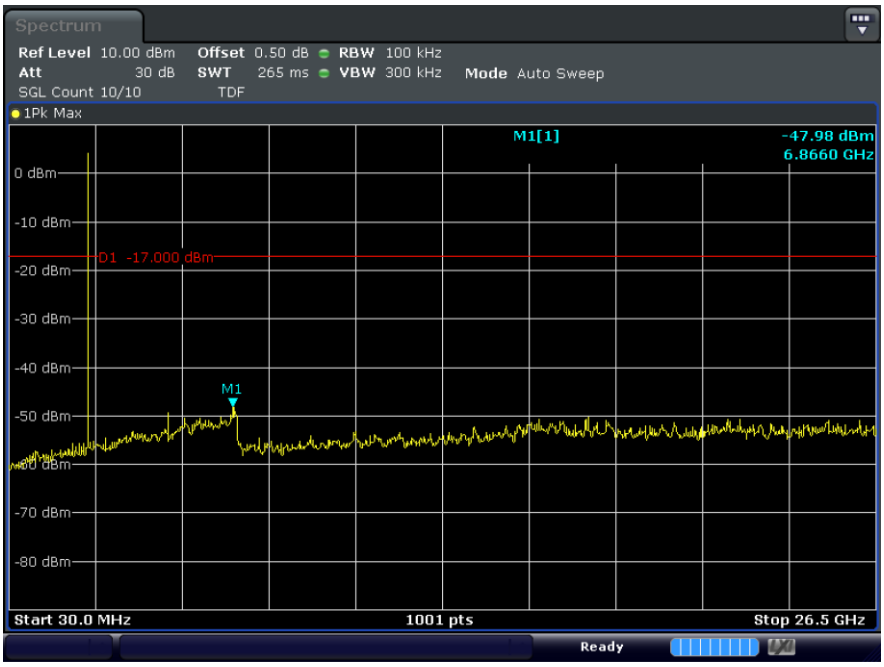
A.1. Lowest Ch. (2 402 MHz)_Band edge



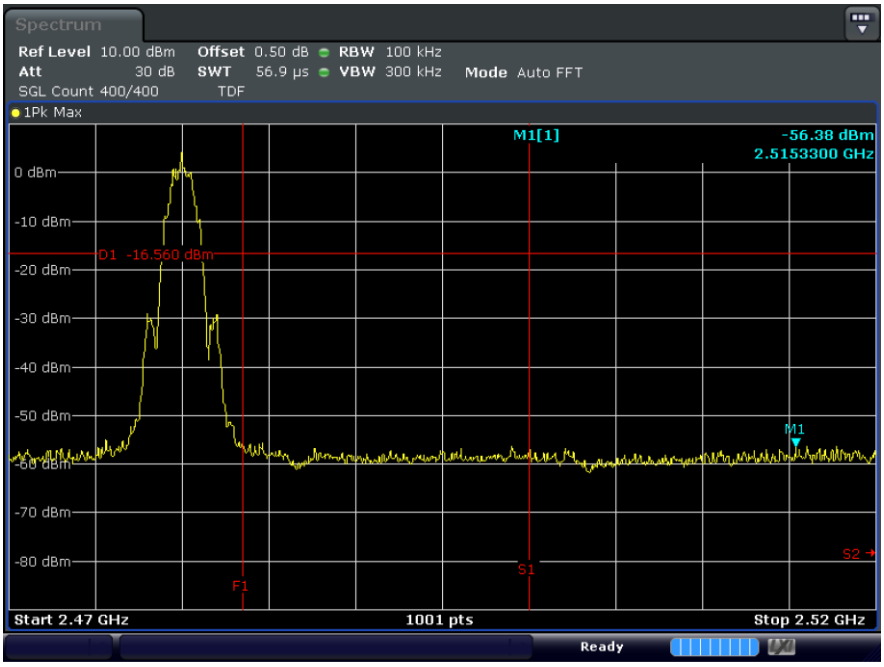
A.2. Lowest Ch. (2 402 MHz)_Spurious emissions



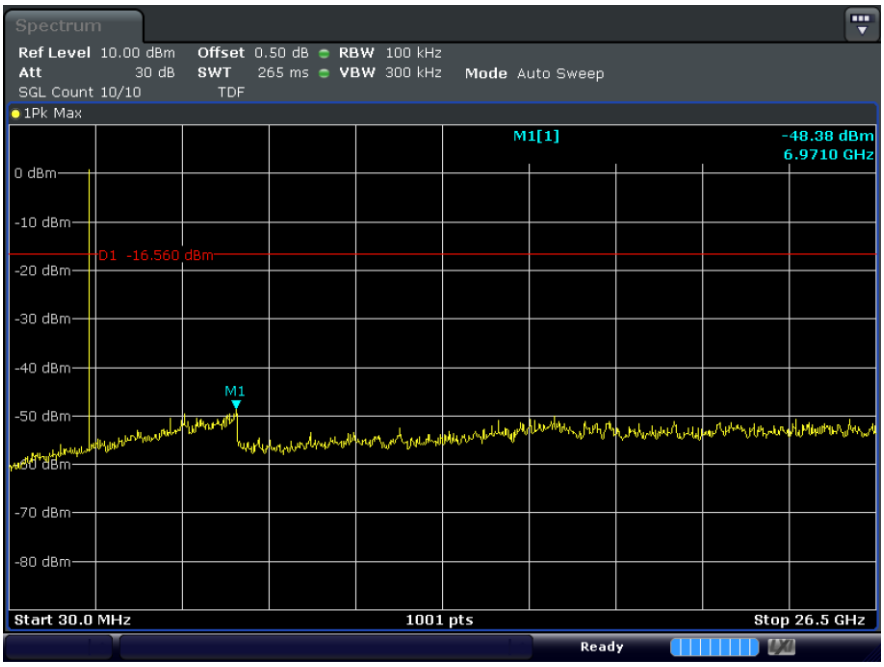
B.1. Middle Ch. (2 440 MHz)_Spurious emissions



C.1. Highest Ch. (2 480 MHz)_ Band edge

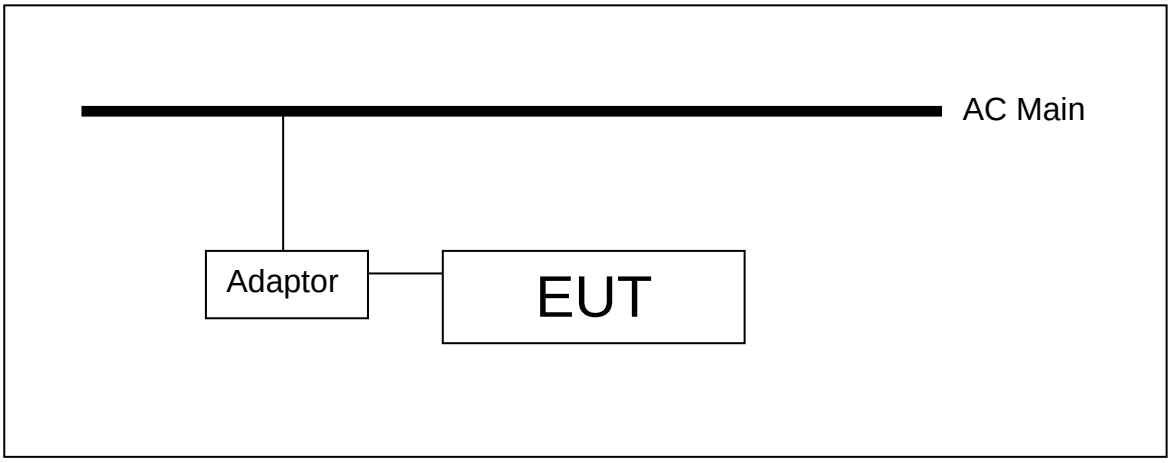


C.2. Highest Ch. (2 480 MHz)_Spurious emissions



11. AC Conducted power line test

11.1. Test setup



11.2. Limit

According to §15.107(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/50 ohms line impedance stabilization network(LISN).
Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted limit (dBuV/m)	
	Quasi-peak	Average
0.15 – 0.50	66-56*	56-46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

※Remark

Decreases with the logarithm of the frequency.

11.3. Test procedure

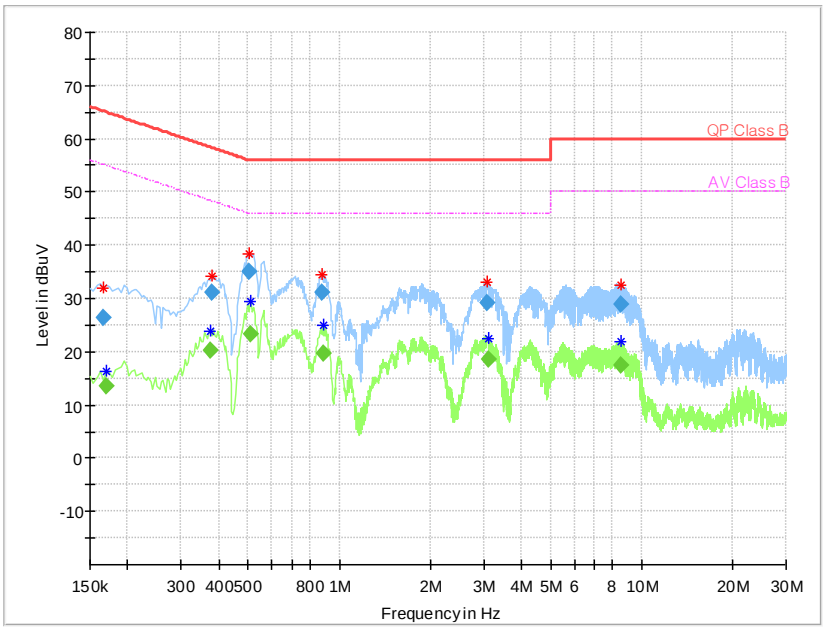
The test procedure is performed in a 6.5 m × 3.6 m × 3.6 m (L×W×H) shielded room. The EUT along with its peripherals were placed on a 1.0m(W)× 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

11.4. Test results

Frequency range: 0.15 MHz ~ 30 MHz
Measured bandwidth: 9 kHz

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.17	26.33	---	65.16	38.83	7000.0	9.00	L1	GND	10.07
0.17	---	13.44	54.96	41.53	7000.0	9.00	N	GND	10.04
0.37	---	20.35	48.41	28.06	7000.0	9.00	N	GND	10.08
0.38	31.13	---	58.32	27.19	7000.0	9.00	N	GND	10.08
0.51	34.98	---	56.00	21.02	7000.0	9.00	N	GND	10.08
0.51	---	23.37	46.00	22.63	7000.0	9.00	N	GND	10.08
0.88	31.20	---	56.00	24.80	7000.0	9.00	N	GND	10.11
0.89	---	19.69	46.00	26.31	7000.0	9.00	N	GND	10.11
3.07	29.16	---	56.00	26.84	7000.0	9.00	N	GND	10.25
3.10	---	18.55	46.00	27.45	7000.0	9.00	N	GND	10.25
8.55	28.80	---	60.00	31.20	7000.0	9.00	N	GND	10.73
8.56	---	17.31	50.00	32.69	7000.0	9.00	N	GND	10.73

※Remark

Line(L1): Hot
Line(N): Neutral

11.4.1. Test plot