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TEST REPORT

Report No.: 24030494HKG-002

OME S.A.S.

Application For Original Grant of 47 CFR Part 15 Certification

Home Diffuser

FCC ID: 2BG9X-23140547

Prepared and Checked by:	**Approved by:**
Signed on File Leung Chun Ning, Peter Assistant Engineer	Digitally signed by Herbert Wong Location: Intertek Testing Services Hong Kong Limited Wong Cheuk Ho, Herbert Assistant Manager Date: May 30, 2024

TEST REPORT

GENERAL INFORMATION

Grantee:	OME S.A.S.
Grantee Address:	115, rue du bac 75007 Paris, France.
FCC Specification Standard:	FCC Part 15, October 1, 2022 Edition
FCC ID:	2BG9X-23140547
Model:	HDMV100001
Type of EUT:	Transceiver
Description of EUT:	Home Diffuser
Brand Name:	Parfums De Marly
Sample Receipt Date:	May 07, 2024
Date of Test:	May 07, 2024 to May 26, 2024
Report Date:	May 30, 2024
Environmental Conditions:	Temperature: +10 to 40°C Relative Humidity: 10 to 90%
Conclusion:	Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 Certification.

TEST REPORT

SUMMARY OF TEST RESULT

Test Items	FCC Part 15 Section	Results
Transmitter Power Line Conducted Emissions	15.207	Complied
Radiated Emission	15.249, 15.209	Complied
Radiated Emission on the Bandedge		Complied
Radiated Emission in Restricted Bands	15.205	Complied

The equipment under test is found to be complying with the following standards:

FCC Part 15, October 1, 2022 Edition

Note:
1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the previsions of this section.
2. Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

TEST REPORT

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TEST REPORT

1.0 GENERAL DESCRIPTION

1.1 Product Description

The Equipment Under Test (EUT), is a portable 2.4GHz BLE (both 1Mbps and 2Mbps) Transceiver for a Home Diffuser. The sample supplied operated on 40 channels, normally at 2402 - 2480MHz. The channels are separated with 2MHz spacing.

The EUT is powered by 120VAC. After switching on the EUT, it can be paired up with a smartphone and perform different functions and change different settings through a mobile app.

Antenna Type: Internal, Integral

For electronic filing, the brief circuit description is saved with filename: Descri.pdf.

1.2 Related Submittal(s) Grants

This is a single application for certification of a transceiver.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). All radiated measurements were performed in an 3m Chamber. Preliminary scans were performed in the 3m Chamber only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The 3m Chamber and conducted measurement facility used to collect the radiated data is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong SAR, China. This test facility and site measurement data have been placed on file with the FCC.

TEST REPORT

2.0 SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.10 (2013).

The device was powered by 120VAC.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

There are 2 different configurations for this EUT, when the car core is standalone and when it is inserted into the car shell. Both configurations have been tested. Only the worst-case data is shown in this report.

2.2 EUT Exercising Software

The EUT exercise program (Direct Test Mode Tool v0.10.2) used during radiated testing was designed to exercise the various system components in a manner similar to a typical use.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Measurement Uncertainty

Decision Rule for compliance: For FCC/IC standard, the measured value must be within the limits of applicable standard without accounting for the measurement uncertainty. For EN/IEC/HKTA/HKTC standard, conformity rules will be used as per standard directly excepted EN/IEC 61000-3-2, EN/IEC 61000-3-3, HKTA1004, HKCA1008, HKTA1019, HKTA1020, HKTA1041 and HKTA1044.

2.5 Support Equipment List and Description

Description	Remark
AC/DC Adaptor (Model: MYX-1201000CP; Input: 100-240VAC 50/60Hz 0.5A; Output: 12.0VDC 1.0A)	Provided by Applicant

TEST REPORT

3.0 EMISSION RESULTS

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading.

The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG - AV

where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
AF = Antenna Factor in dB
CF = Cable Attenuation Factor in dB
AG = Amplifier Gain in dB
AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain.

An example for the calculations in the following table is as follows:

FS = RR + LF

where FS = Field Strength in dBµV/m
RR = RA - AG - AV in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29.0 dB and average factor of 5.0 dB are subtracted, giving a field strength of 27.0 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
AV = 5.0 dB
FS = RR + LF
FS = 18.0 + 9.0 = 27.0 dBµV/m

RR = 18.0 dBµV
LF = 9.0 dB

Level in µV/m = Common Antilogarithm [(27.0 dBµV/m)/20] = 22.4 µV/m

TEST REPORT

3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 734.82625 MHz.

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: Setup Photos.pdf.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 9.9 dB

3.4 Conducted Emission Configuration Photograph

For electronic filing, the worst-case line-conducted configuration photographs are saved with filename: Setup Photos.pdf.

3.5 Conducted Emission Data

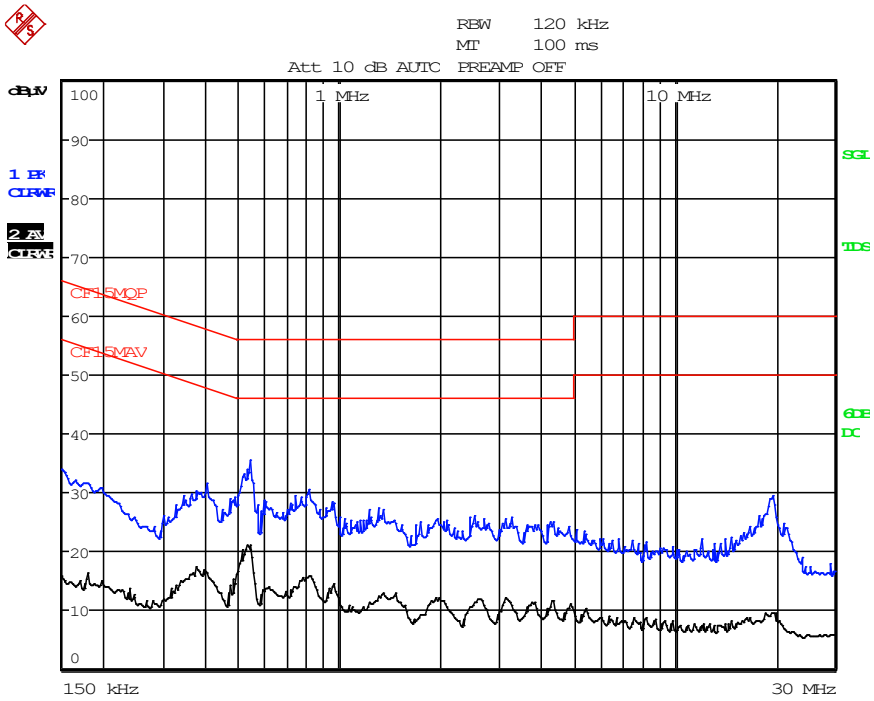
The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Pass by over 20 dB

TEST REPORT

CONDUCTED EMISSION

Model: HDMV100001
Date of Test: May 23, 2024
Worst-Case Operating Mode: BLE Operating



Note: Measurement Uncertainty is ±4.2dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: HDMV100001
Date of Test: May 07, 2024
Worst-Case Operating Mode: Transmitting (BLE 1M)

Table 1

Pursuant to FCC Part 15 Section 15.249 Requirement

Lowest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	2402.000	72.1	33	29.4	68.5	94.0	-25.5
H	4804.000	29.9	33	34.9	31.8	54.0	-22.2
V	7206.000	27.8	33	37.9	32.7	54.0	-21.3
H	9608.000	27.5	33	40.4	34.9	54.0	-19.1
H	12010.000	29.8	33	40.5	37.3	54.0	-16.7
V	14412.000	34.6	33	40.0	41.6	54.0	-12.4

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	2402.000	89.1	33	29.4	85.5	114.0	-28.5
H	4804.000	44.0	33	34.9	45.9	74.0	-28.1
V	7206.000	41.6	33	37.9	46.5	74.0	-27.5
H	9608.000	40.6	33	40.4	48.0	74.0	-26.0
H	12010.000	43.4	33	40.5	50.9	74.0	-23.1
V	14412.000	48.0	33	40.0	55.0	74.0	-19.0

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: HDMV100001
Date of Test: May 07, 2024
Worst-Case Operating Mode: Transmitting (BLE 1M)

Table 2

Pursuant to FCC Part 15 Section 15.249 Requirement

Middle Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	2440.000	79.5	33	29.4	75.9	94.0	-18.1
H	4880.000	31.8	33	34.9	33.7	54.0	-20.3
V	7320.000	28.1	33	37.9	33.0	54.0	-21.0
H	9760.000	28.1	33	40.4	35.5	54.0	-18.5
V	12200.000	30.2	33	40.5	37.7	54.0	-16.3
H	14640.000	35.6	33	38.4	41.0	54.0	-13.0

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	2440.000	95.7	33	29.4	92.1	114.0	-21.9
H	4880.000	46.0	33	34.9	47.9	74.0	-26.1
V	7320.000	41.2	33	37.9	46.1	74.0	-27.9
H	9760.000	41.4	33	40.4	48.8	74.0	-25.2
V	12200.000	43.5	33	40.5	51.0	74.0	-23.0
H	14640.000	48.9	33	38.4	54.3	74.0	-19.7

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: HDMV100001
Date of Test: May 07, 2024
Worst-Case Operating Mode: Transmitting (BLE 1M)

Table 3

Pursuant to FCC Part 15 Section 15.249 Requirement

Highest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	2480.000	73.5	33	29.4	69.9	94.0	-24.1
H	4960.000	33.1	33	34.9	35.0	54.0	-19.0
V	7440.000	27.8	33	37.9	32.7	54.0	-21.3
H	9920.000	27.6	33	40.4	35.0	54.0	-19.0
H	12400.000	30.1	33	40.5	37.6	54.0	-16.4
H	14880.000	35.0	33	38.4	40.4	54.0	-13.6

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	2480.000	90.2	33	29.4	86.6	114.0	-27.4
H	4960.000	48.4	33	34.9	50.3	74.0	-23.7
V	7440.000	41.3	33	37.9	46.2	74.0	-27.8
H	9920.000	41.3	33	40.4	48.7	74.0	-25.3
H	12400.000	44.0	33	40.5	51.5	74.0	-22.5
H	14880.000	48.5	33	38.4	53.9	74.0	-20.1

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: HDMV100001
Date of Test: May 07, 2024
Worst-Case Operating Mode: Transmitting (BLE 2M)

Table 4

Pursuant to FCC Part 15 Section 15.249 Requirement

Lowest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	2402.000	68.1	33	29.4	64.5	94.0	-29.5
H	4804.000	31.6	33	34.9	33.5	54.0	-20.5
V	7206.000	27.6	33	37.9	32.5	54.0	-21.5
V	9608.000	27.2	33	40.4	34.6	54.0	-19.4
V	12010.000	29.6	33	40.5	37.1	54.0	-16.9
H	14412.000	34.4	33	40.0	41.4	54.0	-12.6

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	2402.000	91.2	33	29.4	87.6	114.0	-26.4
H	4804.000	47.3	33	34.9	49.2	74.0	-24.8
V	7206.000	41.9	33	37.9	46.8	74.0	-27.2
V	9608.000	40.9	33	40.4	48.3	74.0	-25.7
V	12010.000	43.2	33	40.5	50.7	74.0	-23.3
H	14412.000	47.8	33	40.0	54.8	74.0	-19.2

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: HDMV100001
Date of Test: May 07, 2024
Worst-Case Operating Mode: Transmitting (BLE 2M)

Table 5

Pursuant to FCC Part 15 Section 15.249 Requirement

Middle Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	2440.000	72.5	33	29.4	68.9	94.0	-25.1
H	4880.000	29.8	33	34.9	31.7	54.0	-22.3
V	7320.000	28.1	33	37.9	33.0	54.0	-21.0
V	9760.000	28.1	33	40.4	35.5	54.0	-18.5
V	12200.000	30.1	33	40.5	37.6	54.0	-16.4
H	14640.000	35.5	33	38.4	40.9	54.0	-13.1

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	2440.000	94.1	33	29.4	90.5	114.0	-23.5
H	4880.000	48.3	33	34.9	50.2	74.0	-23.8
V	7320.000	41.7	33	37.9	46.6	74.0	-27.4
V	9760.000	40.9	33	40.4	48.3	74.0	-25.7
V	12200.000	43.5	33	40.5	51.0	74.0	-23.0
H	14640.000	48.9	33	38.4	54.3	74.0	-19.7

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: HDMV100001
Date of Test: May 07, 2024
Worst-Case Operating Mode: Transmitting (BLE 2M)

Table 6

Pursuant to FCC Part 15 Section 15.249 Requirement

Highest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	2480.000	68.6	33	29.4	65.0	94.0	-29.0
H	4960.000	30.1	33	34.9	32.0	54.0	-22.0
H	7440.000	27.9	33	37.9	32.8	54.0	-21.2
V	9920.000	27.6	33	40.4	35.0	54.0	-19.0
H	12400.000	30.2	33	40.5	37.7	54.0	-16.3
V	14880.000	35.0	33	38.4	40.4	54.0	-13.6

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	2480.000	93.0	33	29.4	89.4	114.0	-24.6
H	4960.000	49.9	33	34.9	51.8	74.0	-22.2
H	7440.000	41.1	33	37.9	46.0	74.0	-28.0
V	9920.000	41.5	33	40.4	48.9	74.0	-25.1
H	12400.000	43.8	33	40.5	51.3	74.0	-22.7
V	14880.000	48.5	33	38.4	53.9	74.0	-20.1

Notes:
1. Peak Detector Data unless otherwise stated.
2. Average detector is applied according to ANSI C63.10.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: HDMV100001
Date of Test: May 22, 2024
Worst-Case Operating Mode: BLE Operating

Table 7

Pursuant to FCC Part 15 Section 15.209 Requirement

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	58.251	27.1	16	11.0	22.1	40.0	-17.9
V	131.486	25.9	16	14.0	23.9	43.5	-19.6
V	146.521	26.6	16	14.0	24.6	43.5	-18.9
H	213.694	26.2	16	17.0	27.2	43.5	-16.3
V	734.826	22.1	16	30.0	36.1	46.0	-9.9
H	910.881	15.4	16	33.0	32.4	46.0	-13.6

Notes:
1. Peak and Quasi-Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emissions within the restricted band meet the requirement of FCC Part 15 Section 15.205.
6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

4.0 EQUIPMENT PHOTOGRAPHS

For electronic filing, the photographs are saved with filename: External Photos.pdf and Internal Photos.pdf.

5.0 PRODUCT LABELLING

For electronics filing, the FCC ID label artwork and the label location are saved with filename: Label.pdf.

6.0 TECHNICAL SPECIFICATIONS

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: Block.pdf and Circuit.pdf respectively.

7.0 INSTRUCTION MANUAL

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: Manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

TEST REPORT

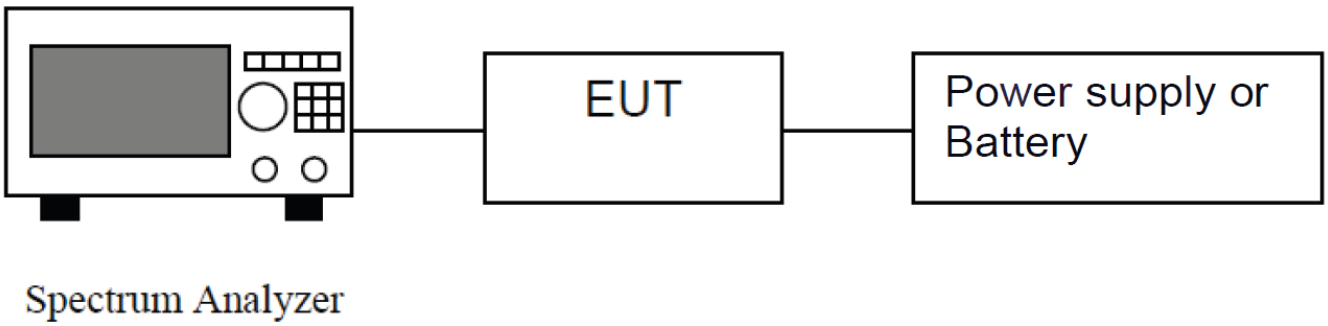
8.0 MISCELLANEOUS INFORMATION

The miscellaneous information includes details of the test procedure and measured bandwidth and calculation of factor such as pulse desensitization and averaging factor.

8.1 Radiated Emission on the Bandedge

From the following plots, they show that the fundamental emissions are confined in the specified band (2400MHz to 2483.5MHz). In case of the fundamental emissions are within two standard bandwidths from the bandedge, the delta measurement technique is used for determining bandedge compliance. Standard bandwidth is the bandwidth specified by ANSI C63.10 (2013) for frequency being measured.

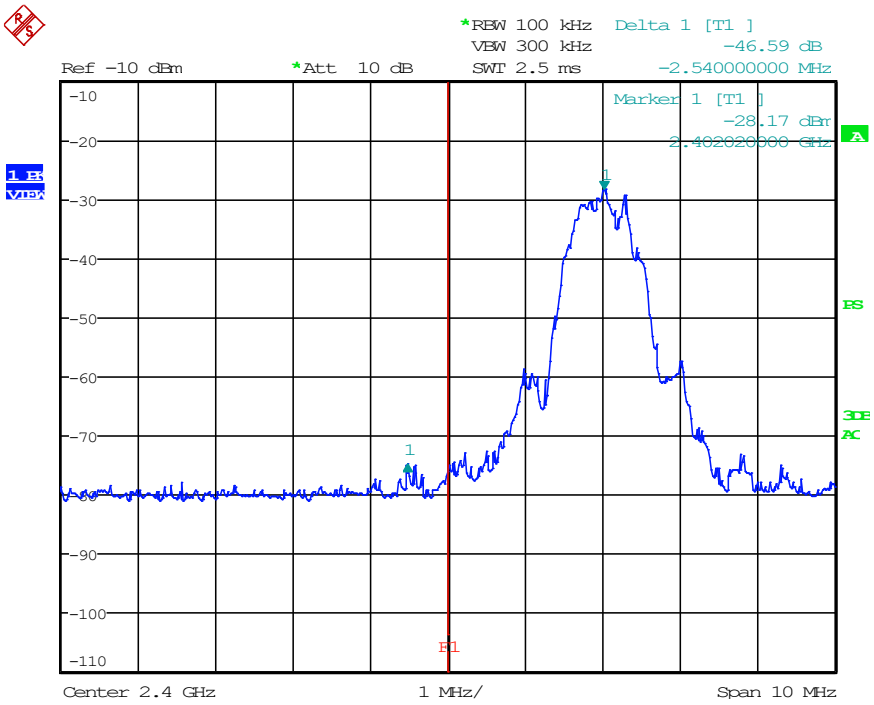
Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50dB below the level of the fundamental or to the general radiated emissions limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of Part 15.249(d).

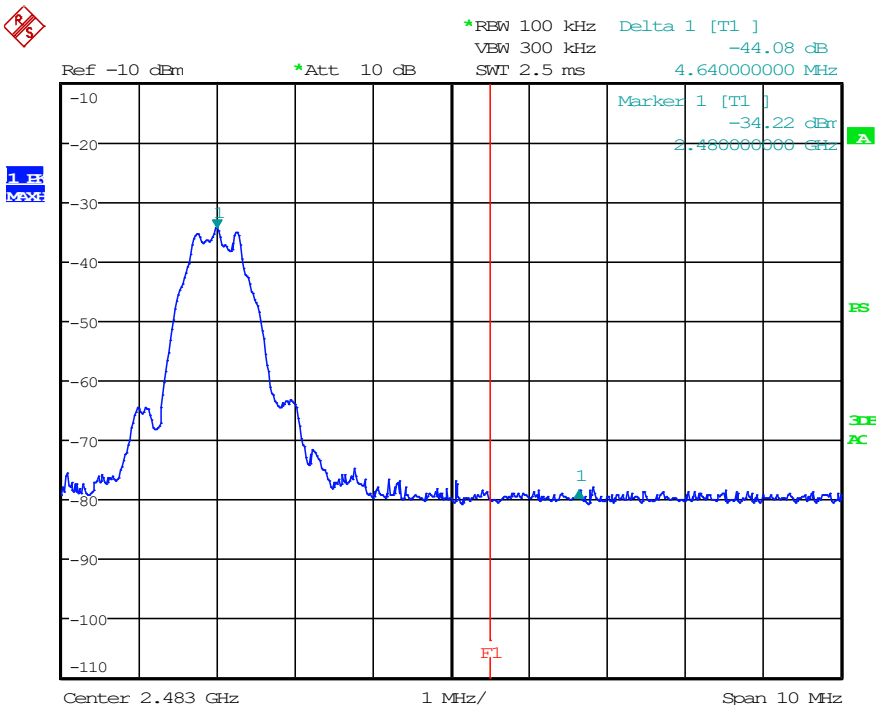


Block diagram of Test setup

TEST REPORT

PEAK MEASUREMENT (BLE 1M)





TEST REPORT

PEAK MEASUREMENT (BLE 1M)

Bandedge compliance is determined by applying marker-delta method, i.e. (Bandedge Plot).

Lower Bandedge

Peak Resultant Field Strength = Fundamental Emissions (Peak Value) – delta from the plot

= 85.5 dBµV/m - 46.6 dB
= 38.9 dBµV/m

Average Resultant Field Strength = Fundamental Emissions (Average Value) – delta from the plot

= 68.5 dBµV/m - 46.6 dB
= 21.9 dBµV/m

Upper Bandedge

Peak Resultant Field Strength = Fundamental Emissions (Peak Value) – delta from the plot

= 86.6 dBµV/m - 44.1 dB
= 42.5 dBµV/m

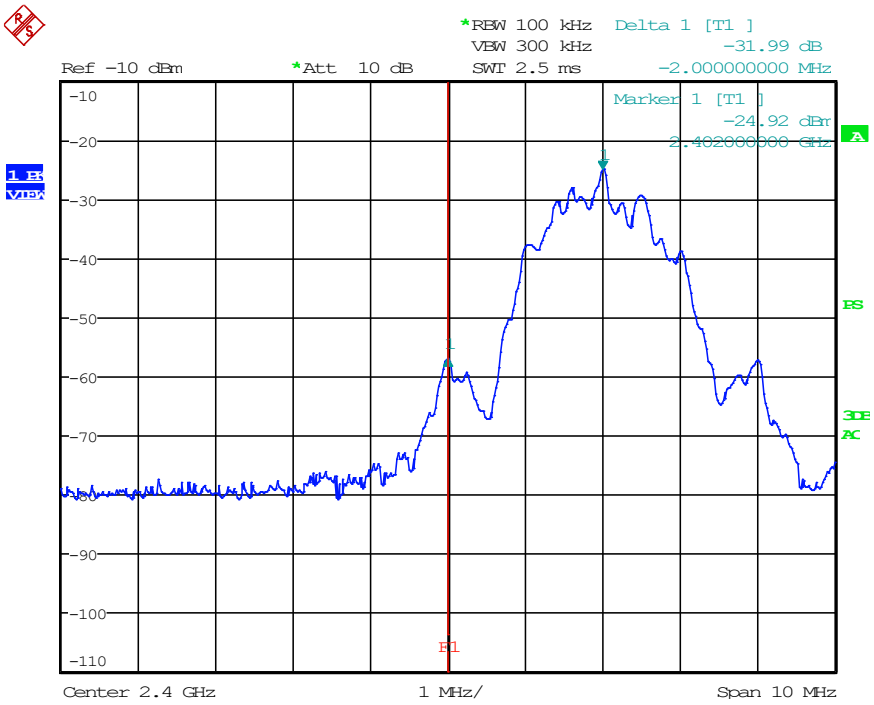
Average Resultant Field Strength = Fundamental Emissions (Average Value) – delta from the plot

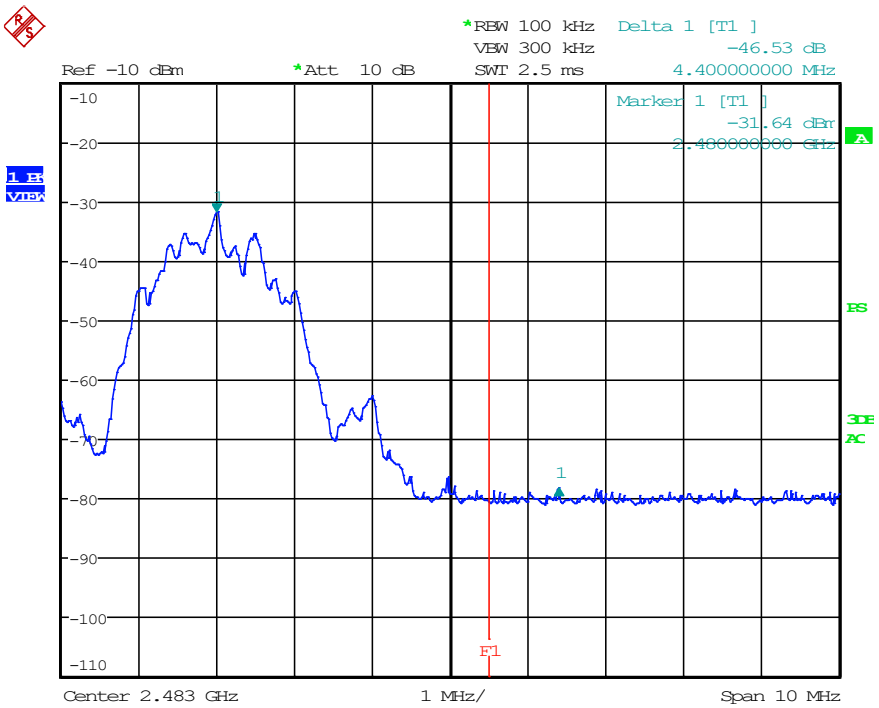
= 69.9 dBµV/m - 44.1 dB
= 25.8 dBµV/m

The resultant field strength meets the general radiated emission limit in Section 15.209, which does not exceed 74 dBµV/m (Peak Limit) and 54 dBµV/m (Average Limit).

TEST REPORT

PEAK MEASUREMENT (BLE 2M)





TEST REPORT

PEAK MEASUREMENT (BLE 2M)

Bandedge compliance is determined by applying marker-delta method, i.e. (Bandedge Plot).

Lower Bandedge

Peak Resultant Field Strength = Fundamental Emissions (Peak Value) – delta from the plot

= 87.6 dBµV/m - 32.0 dB
= 55.6 dBµV/m

Average Resultant Field Strength = Fundamental Emissions (Average Value) – delta from the plot

= 64.5 dBµV/m - 32.0 dB
= 32.5 dBµV/m

Upper Bandedge

Peak Resultant Field Strength = Fundamental Emissions (Peak Value) – delta from the plot

= 89.4 dBµV/m - 46.5 dB
= 42.9 dBµV/m

Average Resultant Field Strength = Fundamental Emissions (Average Value) – delta from the plot

= 65.0 dBµV/m - 46.5 dB
= 18.5 dBµV/m

The resultant field strength meets the general radiated emission limit in Section 15.209, which does not exceed 74 dBµV/m (Peak Limit) and 54 dBµV/m (Average Limit).

8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period (Teff) is approximately 625µs for a digital "1" bit which illustrated on technical specification, with a resolution bandwidth (3dB) of 3MHz, so the pulse desensitivity factor is 0dB.

8.3 Calculation of Average Factor

Not Applicable

8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately 0.8m in height above the ground plane for emission measurement at or below 1GHz and 1.5m in height above the ground plane for emission measurement above 1GHz. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.10 (2013).

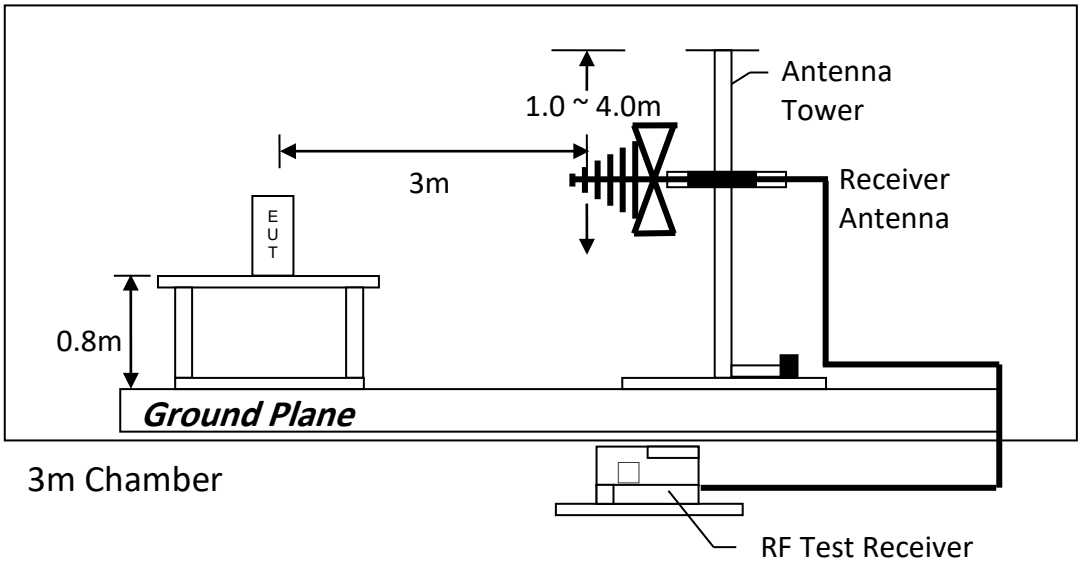
The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 3 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

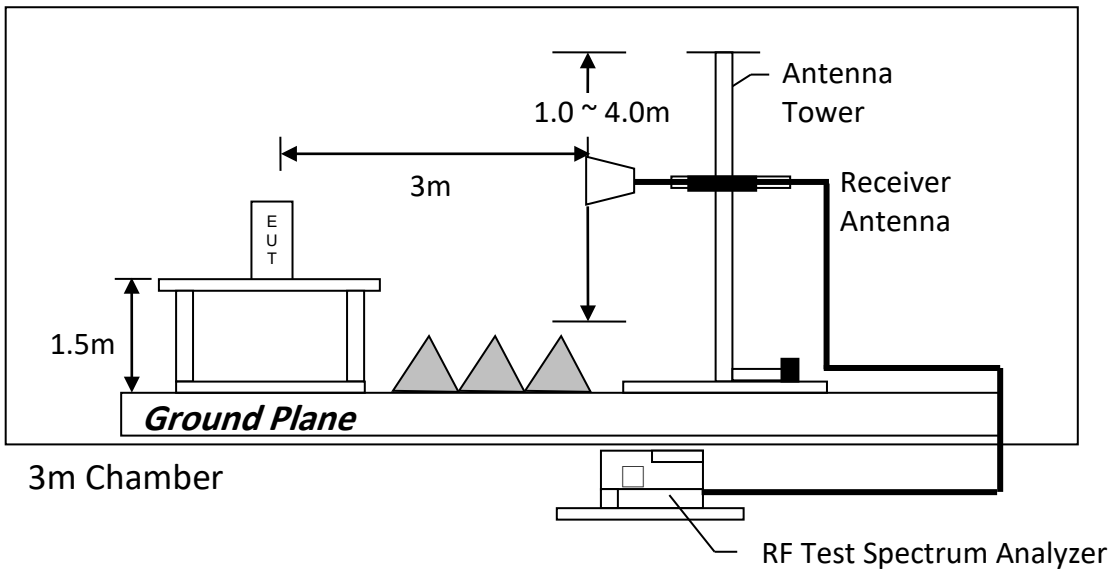
TEST REPORT

8.4.1 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions 30MHz to 1GHz



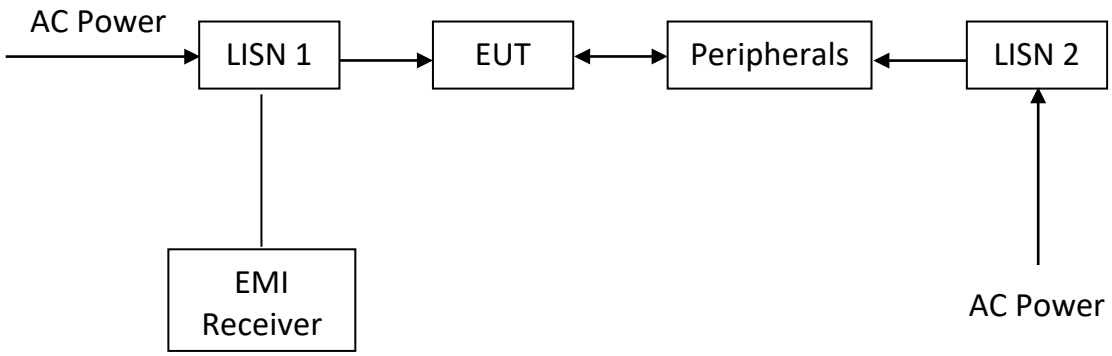
Test setup of radiated emissions above 1GHz

8.4.2 Conducted Emission Test Procedures

For tabletop equipment, the EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table. For floor-standing equipment, the EUT and all cables were insulated, if required, from the ground plane by up to 12 mm of insulating material. 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 provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

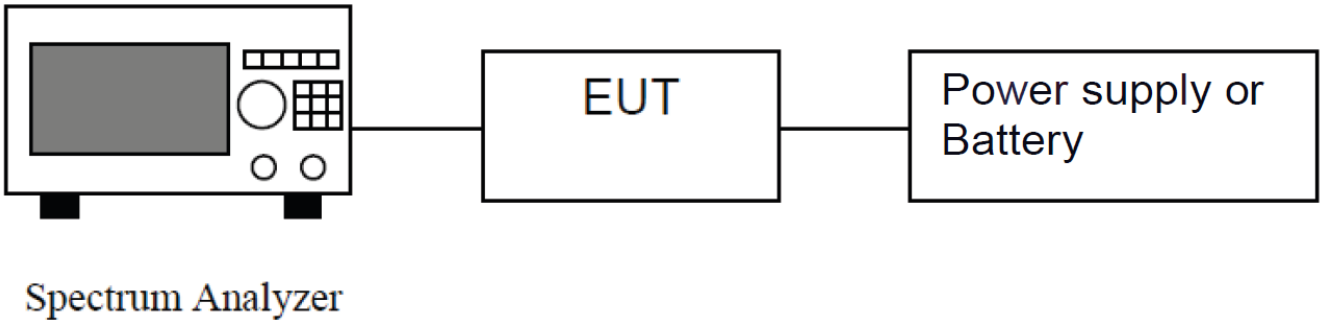
All connecting cables of EUT and peripherals were moved to find the maximum emission.

8.4.3 Conducted Emission Test Setup



TEST REPORT

8.5 Occupied Bandwidth

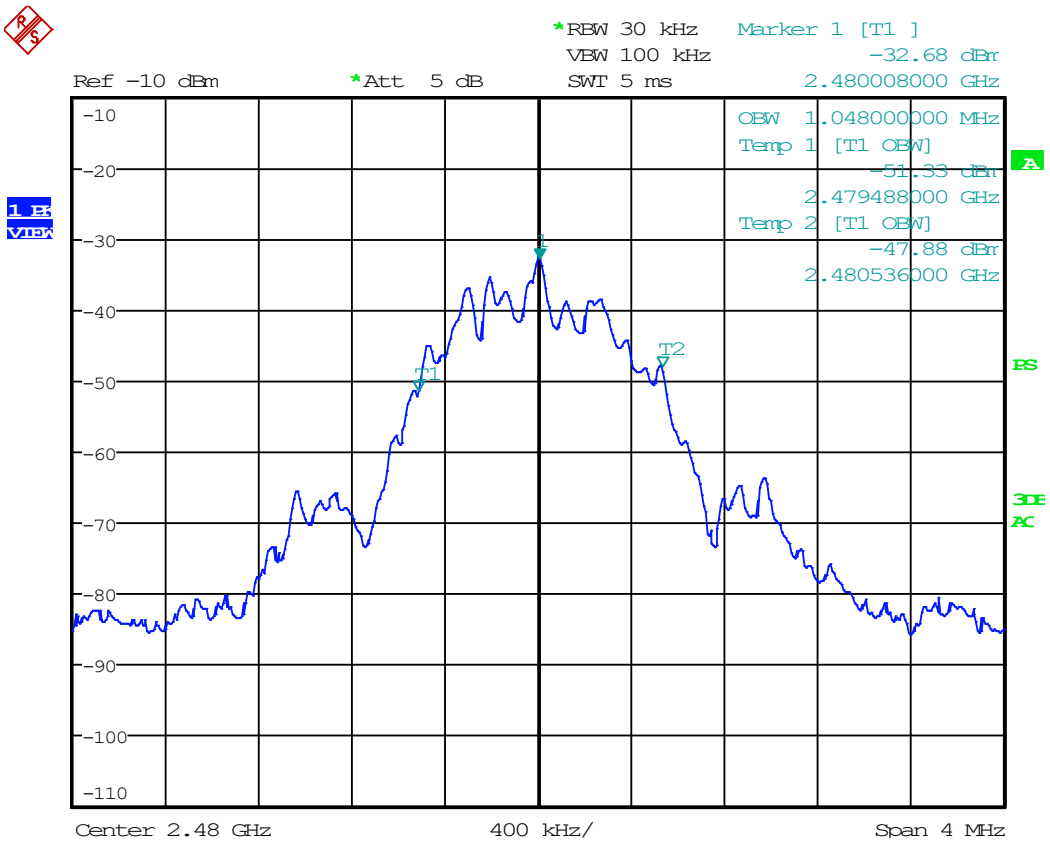


Block diagram of Test setup

Occupied Bandwidth Results: (BLE 1M)

Bluetooth (MHz)	Occupied Bandwidth (kHz)
Low Channel: 2402	1040
Middle Channel: 2440	1048
High Channel: 2480	1048

The worst case is shown as below:

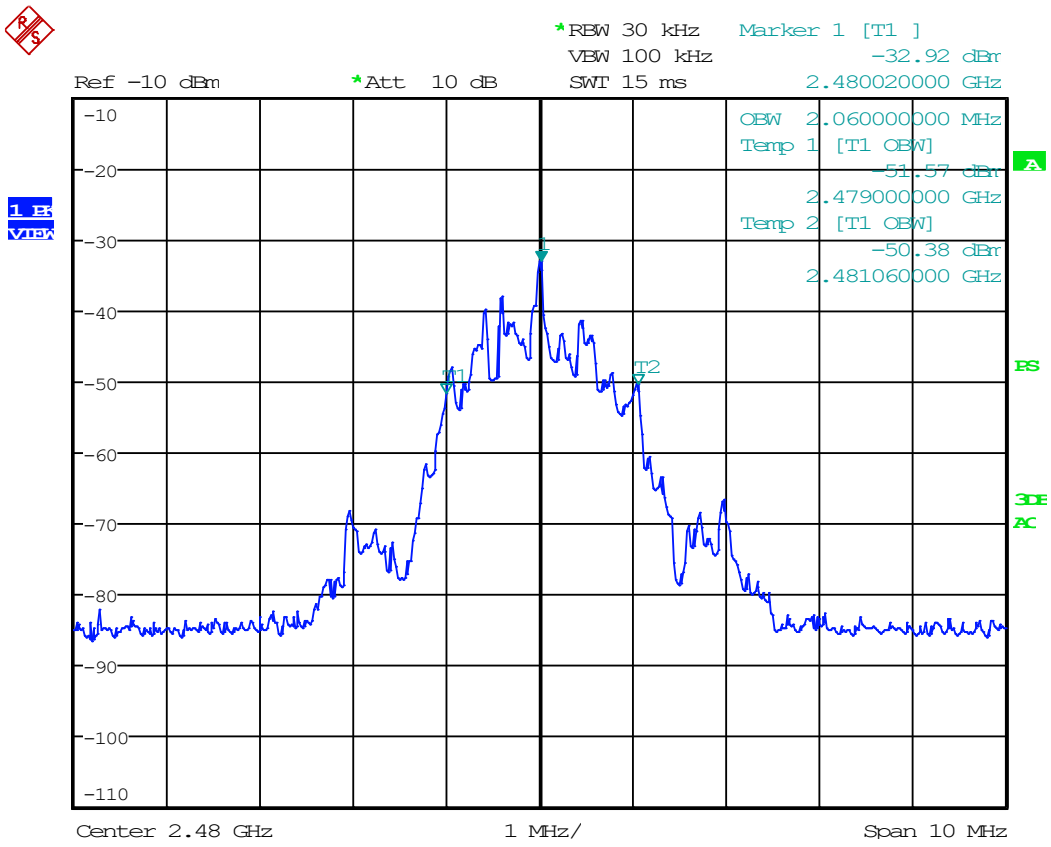


TEST REPORT

Occupied Bandwidth Results: (BLE 2M)

Bluetooth (MHz)	Occupied Bandwidth (kHz)
Low Channel: 2402	2060
Middle Channel: 2440	2048
High Channel: 2480	2060

The worst case is shown as below:



9 CONFIDENTIALITY REQUEST

For electronic filing, a preliminary copy of the confidentiality request is saved with filename: Request.pdf.

10 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	EMI Test Receiver (9kHz to 26.5GHz)	Biconical Antenna (30MHz to 300MHz)	Log Periodic Antenna
Registration No.	EW-3156	EW-3241	EW-3244
Manufacturer	ROHDESCHWARZ	EMCO	EMCO
Model No.	ESR26	3110C	3148B
Calibration Date	January 31, 2024	February 26, 2022	August 30, 2022
Calibration Due Date	January 31, 2025	May 26, 2024	May 30, 2024

Equipment	Double Ridged Guide Antenna (1GHz - 18GHz)	Active Loop Antenna (H-field) (9kHz to 30MHz)	RF Preamplifier (9kHz to 6000MHz)
Registration No.	EW-0194	EW-3326	EW-3006b
Manufacturer	EMCO	EMCO	SCHWARZBECK
Model No.	3115	6502	BBV9718
Calibration Date	May 10, 2023	January 05, 2024	October 20, 2023
Calibration Due Date	November 10, 2024	July 05, 2025	October 20, 2024

Equipment	2.4GHz Notch Filter	14m Double Shield RF Cable (9kHz - 6GHz)	RF Cable 14m (1GHz to 26.5GHz)
Registration No.	EW-3435	EW-2376	EW-2781
Manufacturer	MICROWAVE	RADIALL	GREATBILLION
Model No.	N0324413	n m/br56/bnc m 14m	SMA m/SHF5MPU /SMA m ra14m,26G
Calibration Date	September 26, 2023	September 19, 2023	January 16, 2024
Calibration Due Date	September 26, 2024	September 19, 2024	January 16, 2025

Equipment	12 metre RF Cable (1-40)GHz	Pyramidal Horn Antenna
Registration No.	EW-2774	EW-0905
Manufacturer	GREATBILLION	EMCO
Model No.	SMA m-m ra 12m 40G outdoor	3160-09
Calibration Date	January 16, 2024	December 15, 2023
Calibration Due Date	January 16, 2025	June 15, 2025

TEST REPORT

2) Conducted Emissions Test

Equipment	RF Cable 240cm (RG142) (9kHz to 30MHz)	Artificial Mains Network	EMI Test Receiver (9kHz to 3GHz)
Registration No.	EW-2454	EW-3360	EW-3095
Manufacturer	RADIALL	ROHDESCHWARZ	ROHDESCHWARZ
Model No.	Bnc m st / 142 / bnc mra 240cm	ENV-216	ESCI
Calibration Date	June 13, 2023	April 07, 2024	January 18, 2024
Calibration Due Date	June 13, 2024	April 07, 2025	January 18, 2025

3) Bandedge & OBW Measurement

Equipment	EMI Test Receiver (9kHz to 3GHz)
Registration No.	EW-3095
Manufacturer	ROHDESCHWARZ
Model No.	ESCI
Calibration Date	January 18, 2024
Calibration Due Date	January 18, 2025

4) Control Software for Radiated Emission

Software Information	
Software Name	EMC32
Manufacturer	ROHDESCHWARZ
Software version	10.50.40

END OF TEST REPORT