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TEST REPORT

Report No.: 22060379HKG-002

Sensor Holdings Limited

Application For Original Grant of 47 CFR Part 15 Certification

Single New of RSS-210 Issue 10 Amendment 1 Certification

Motion Capture Glove

FCC ID: 2A7QX-FIDELITY

Prepared and Checked by:	**Approved by:**
Signed on File Wong Cheuk Ho, Herbert Lead Engineer	Digitally signed by Kenneth Wong Location: Intertek Testing Services Hong Kong Limited Wong Kwok Yeung, Kenneth Assistant Supervisor Date: March 17, 2023

TEST REPORT

GENERAL INFORMATION

Grantee:	Sensor Holdings Limited
Grantee Address:	114 Rockfield Road, Penrose, Auckland 1061, New Zealand.
Manufacturer:	Sensor Holdings Limited
Manufacturer Address:	114 Rockfield Road, Penrose, Auckland 1061, New Zealand.
FCC Specification Standard:	FCC Part 15, October 1, 2021 Edition
FCC ID:	2A7QX-FIDELITY
FCC Model(s):	12022
IC Specification Standard:	RSS-210 Issue 10 Amendment 1, April 2020 RSS-Gen Issue 5 Amendment 2, February 2021
Type of EUT:	Transceiver
Description of EUT:	Motion Capture Glove
Brand Name:	StretchSense MoCap Pro Fidelity Glove
Serial Number:	N/A
Sample Receipt Date:	June 08, 2022
Date of Test:	June 08, 2022 to June 20, 2022
Report Date:	March 17, 2023
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 / RSS-210 Issue 10 Amendment 1 Certification.

TEST REPORT

SUMMARY OF TEST RESULT

Test Items	FCC Part 15 Section	RSS-210 / RSS-Gen#	Results
Transmitter Power Line Conducted Emissions	15.207	8.8#	Complied
Radiated Emission	15.249, 15.209	B.10 / 8.9#	Complied
Radiated Emission on the Bandedge			Complied
Radiated Emission in Restricted Bands	15.205	8.10#	Complied

For all technical data, which can be referred to Annex B – Report cover sheet.
For electronic filing, the Annex B – Report cover sheet is saved with filename: Annex B.pdf.

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

FCC Part 15, October 1, 2021 Edition
RSS-210 Issue 10 Amendment 1, April 2020
RSS-Gen Issue 5 Amendment 2, February 2021

Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the pervisions 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 the Bluetooth BLE transceiver of MoCap Pro Fidelty glove, which is a wearable garment that captures finger motion by reading deformation data from embedded stretchable capacitance sensors. The EUT is powered by internal rechargeable LiPo Battery (3.4VDC - 4.2VDC). This battery can be charged by USB port (5VDC).

Antenna Type: Internal, Integral
Peak Antenna Gain: 2.8 dBi

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 and IC No. 2042H, CABID is "HKAP01".

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 USB port of notebook computer during test.

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.

2.2 EUT Exercising Software

The EUT exercise program (if any) 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. For these excepted or not mentioned standards, Cl 4.2.2 of ILAC-G8:09/2019 decision rules will be reference and guard band will be equal to our measurement uncertainty with 95% confidence level (k=2). In case, the measured value is within guard band region, undetermined decision will be used.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

2.5 Support Equipment List and Description

Description	Remark
HP Notebook Computer (Adaptor Model: HSTNN-CA15)	Provided by Intertek
1 x LAN cable with length of 2.0 meter long	Provided by Intertek
1 x USB cable with length of 1.8 meter long	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 RR = 18.0 dBµV
CF = 1.6 dB LF = 9.0 dB
AG = 29.0 dB
AV = 5.0 dB
FS = RR + LF
FS = 18.0 + 9.0 = 27.0 dBµV/m

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 522.086 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated 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 0.2 dB

3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 0.155 MHz

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

3.5 Conducted Emission Data

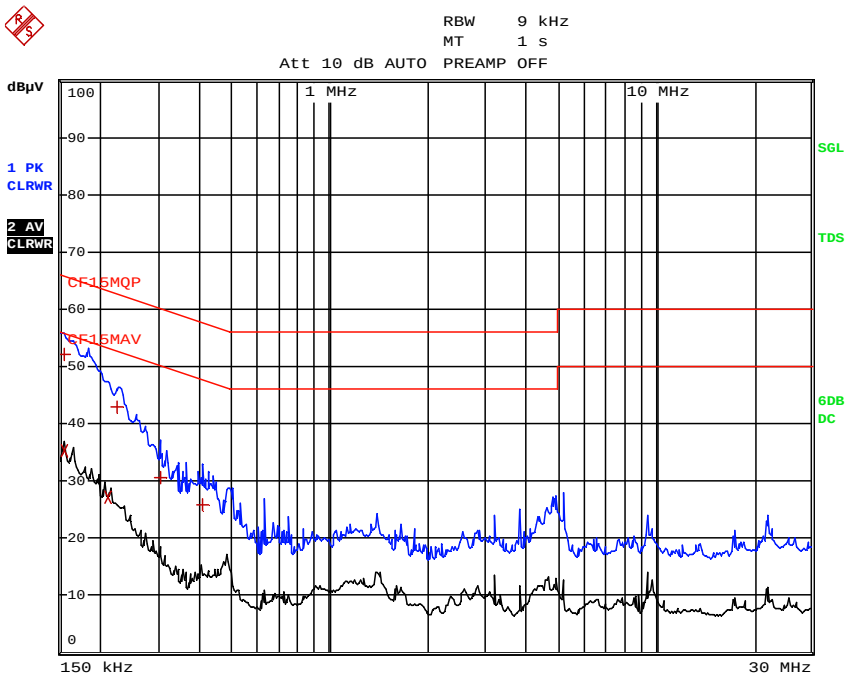
For electronic filing, the graph and data table of conducted emission is saved with filename: conducted.pdf.

Judgment: Pass by 13.7 dB

TEST REPORT

CONDUCTED EMISSION

Model: 12022
Date of Test: 20 Jun 2022
Worst-Case Operating Mode: Bluetooth Operating and charging



EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	154.5 kHz	52.08	N	-13.67
2	CISPR Average	154.5 kHz	35.25	L1	-20.50
2	CISPR Average	213 kHz	27.21	N	-25.87
1	Quasi Peak	226.5 kHz	43.01	N	-19.56
1	Quasi Peak	303 kHz	30.49	L1	-29.66
1	Quasi Peak	406.5 kHz	25.77	L1	-31.94

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

TEST REPORT

RADIATED EMISSIONS

Model: 12022
Date of Test: 20 Jun 2022
Worst-Case Operating Mode: Transmitting (Bluetooth 1M)

Table 1

Pursuant to FCC Part 15 Section 15.249 / RSS-210 B10.0 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	83.8	33	29.4	80.2	94.0	-13.8
V	4804.000	26.9	33	34.9	28.8	54.0	-25.2
V	7206.000	15.7	33	37.9	20.6	54.0	-33.4
H	9608.000	18.2	33	40.4	25.6	54.0	-28.4
V	12010.000	15.3	33	40.5	22.8	54.0	-31.2
H	14412.000	18.6	33	40.0	25.6	54.0	-28.4

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)
H	2402.000	97.4	33	29.4	93.8	114.0	-20.2
V	4804.000	39.8	33	34.9	41.7	74.0	-32.3
V	7206.000	28.9	33	37.9	33.8	74.0	-40.2
H	9608.000	31.4	33	40.4	38.8	74.0	-35.2
V	12010.000	27.8	33	40.5	35.3	74.0	-38.7
H	14412.000	31.6	33	40.0	38.6	74.0	-35.4

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 meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 12022
Date of Test: 20 Jun 2022
Worst-Case Operating Mode: Transmitting (Bluetooth 1M)

Table 2

Pursuant to FCC Part 15 Section 15.249 / RSS-210 B10.0 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)
H	2440.000	82.4	33	29.4	78.8	94.0	-15.2
V	4880.000	30.1	33	34.9	32.0	54.0	-22.0
V	7320.000	27.6	33	37.9	32.5	54.0	-21.5
H	9760.000	27.2	33	40.4	34.6	54.0	-19.4
V	12200.000	26.4	33	40.5	33.9	54.0	-20.1
H	14640.000	33.1	33	38.4	38.5	54.0	-15.5

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	2440.000	97.2	33	29.4	93.6	114.0	-20.4
V	4880.000	42.6	33	34.9	44.5	74.0	-29.5
V	7320.000	40.7	33	37.9	45.6	74.0	-28.4
H	9760.000	41.5	33	40.4	48.9	74.0	-25.1
V	12200.000	38.9	33	40.5	46.4	74.0	-27.6
H	14640.000	46.1	33	38.4	51.5	74.0	-22.5

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 meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 12022
Date of Test: 20 Jun 2022
Worst-Case Operating Mode: Transmitting (Bluetooth 1M)

Table 3

Pursuant to FCC Part 15 Section 15.249 / RSS-210 B10.0 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)
H	2480.000	82.1	33	29.4	78.5	94.0	-15.5
V	4960.000	30.8	33	34.9	32.7	54.0	-21.3
V	7440.000	17.7	33	37.9	22.6	54.0	-31.4
H	9920.000	16.8	33	40.4	24.2	54.0	-29.8
V	12400.000	18.6	33	40.5	26.1	54.0	-27.9
H	14880.000	19.2	33	38.4	24.6	54.0	-29.4

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)
H	2480.000	96.8	33	29.4	93.2	114.0	-20.8
V	4960.000	42.5	33	34.9	44.4	74.0	-29.6
V	7440.000	30.9	33	37.9	35.8	74.0	-38.2
H	9920.000	30.0	33	40.4	37.4	74.0	-36.6
V	12400.000	31.7	33	40.5	39.2	74.0	-34.8
H	14880.000	32.1	33	38.4	37.5	74.0	-36.5

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 meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 12022
Date of Test: 20 Jun 2022
Worst-Case Operating Mode: Transmitting (Bluetooth 2M)

Table 4

Pursuant to FCC Part 15 Section 15.249 / RSS-210 B10.0 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	88.4	33	29.4	84.8	94.0	-9.2
V	4804.000	34.5	33	34.9	36.4	54.0	-17.6
V	7206.000	18.9	33	37.9	23.8	54.0	-30.2
H	9608.000	17.1	33	40.4	24.5	54.0	-29.5
V	12010.000	16.1	33	40.5	23.6	54.0	-30.4
H	14412.000	19.2	33	40.0	26.2	54.0	-27.8

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	100.4	33	29.4	96.8	114.0	-17.2
V	4804.000	43.7	33	34.9	45.6	74.0	-28.4
V	7206.000	31.6	33	37.9	36.5	74.0	-37.5
H	9608.000	29.2	33	40.4	36.6	74.0	-37.4
V	12010.000	28.1	33	40.5	35.6	74.0	-38.4
H	14412.000	31.7	33	40.0	38.7	74.0	-35.3

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 meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 12022
Date of Test: 20 Jun 2022
Worst-Case Operating Mode: Transmitting (Bluetooth 2M)

Table 5

Pursuant to FCC Part 15 Section 15.249 / RSS-210 B10.0 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)
H	2440.000	88.2	33	29.4	84.6	94.0	-9.4
V	4880.000	32.0	33	34.9	33.9	54.0	-20.1
V	7320.000	26.7	33	37.9	31.6	54.0	-22.4
H	9760.000	27.2	33	40.4	34.6	54.0	-19.4
V	12200.000	26.4	33	40.5	33.9	54.0	-20.1
H	14640.000	33.4	33	38.4	38.8	54.0	-15.2

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	2440.000	100.1	33	29.4	96.5	114.0	-17.5
V	4880.000	43.5	33	34.9	45.4	74.0	-28.6
V	7320.000	40.4	33	37.9	45.3	74.0	-28.7
H	9760.000	40.8	33	40.4	48.2	74.0	-25.8
V	12200.000	38.7	33	40.5	46.2	74.0	-27.8
H	14640.000	46.1	33	38.4	51.5	74.0	-22.5

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 meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 12022
Date of Test: 20 Jun 2022
Worst-Case Operating Mode: Transmitting (Bluetooth 2M)

Table 6

Pursuant to FCC Part 15 Section 15.249 / RSS-210 B10.0 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)
H	2480.000	86.4	33	29.4	82.8	94.0	-11.2
V	4960.000	30.6	33	34.9	32.5	54.0	-21.5
V	7440.000	18.9	33	37.9	23.8	54.0	-30.2
H	9920.000	17.3	33	40.4	24.7	54.0	-29.3
V	12400.000	17.0	33	40.5	24.5	54.0	-29.5
H	14880.000	20.9	33	38.4	26.3	54.0	-27.7

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	2480.000	99.4	33	29.4	95.8	114.0	-18.2
V	4960.000	42.0	33	34.9	43.9	74.0	-30.1
V	7440.000	31.6	33	37.9	36.5	74.0	-37.5
H	9920.000	30.4	33	40.4	37.8	74.0	-36.2
V	12400.000	30.1	33	40.5	37.6	74.0	-36.4
H	14880.000	34.0	33	38.4	39.4	74.0	-34.6

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 meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: 12022
Date of Test: 20 Jun 2022
Worst-Case Operating Mode: Bluetooth Operating and charging

Table 7

Pursuant to FCC Part 15 Section 15.209 / RSS-GEN 8.9 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	32.008	38.8	16	10.0	32.8	40.0	-7.2
V	48.015	37.8	16	11.0	32.8	40.0	-7.2
V	70.412	45.4	16	7.0	36.4	40.0	-3.6
H	140.056	40.5	16	14.0	38.5	43.5	-5.0
H	420.128	25.6	16	25.0	34.6	46.0	-11.4
V	522.086	34.8	16	27.0	45.8	46.0	-0.2

Notes:
1. 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. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
5. 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 and Canada.

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.

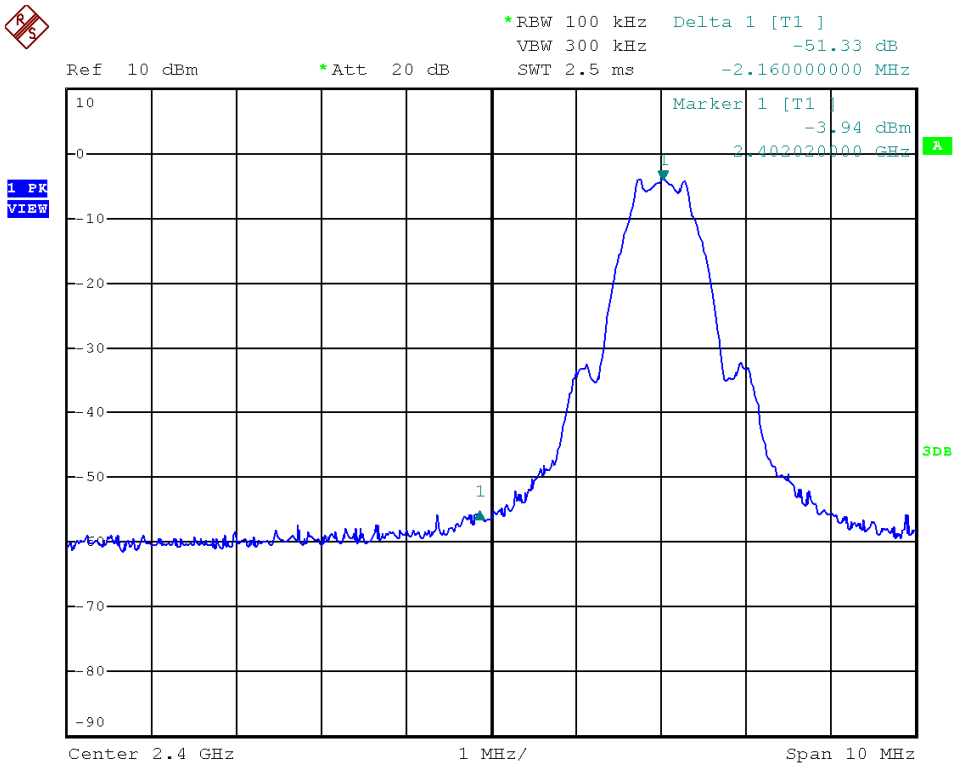
8.1 Radiated Emission on the Bandedge

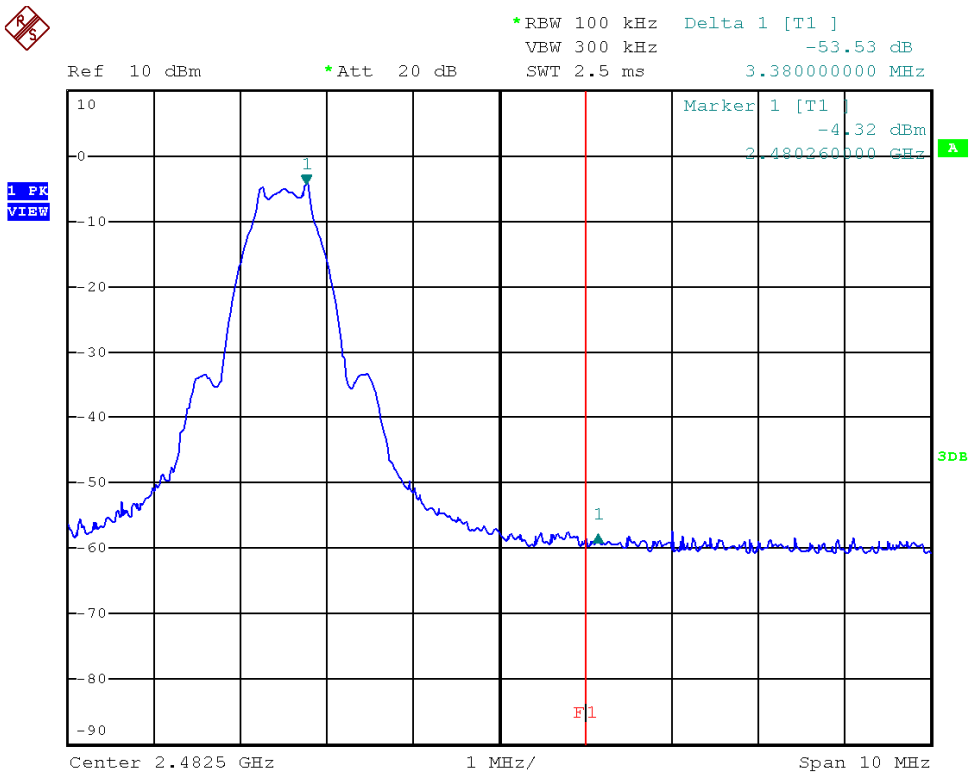
From the following plots, they show that the fundamental emissions are confined in the specified band (2400MHz to 2483.5MHz). In case of the fundamental emissions are within two standard bandwidths from the bandedge, the delta measurement technique is used for determining bandedge compliance. Standard 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 / RSS-Gen 8.9, whichever is the lesser attenuation, which meet the requirement of Part 15.249(d) / RSS-210 B.10.

TEST REPORT

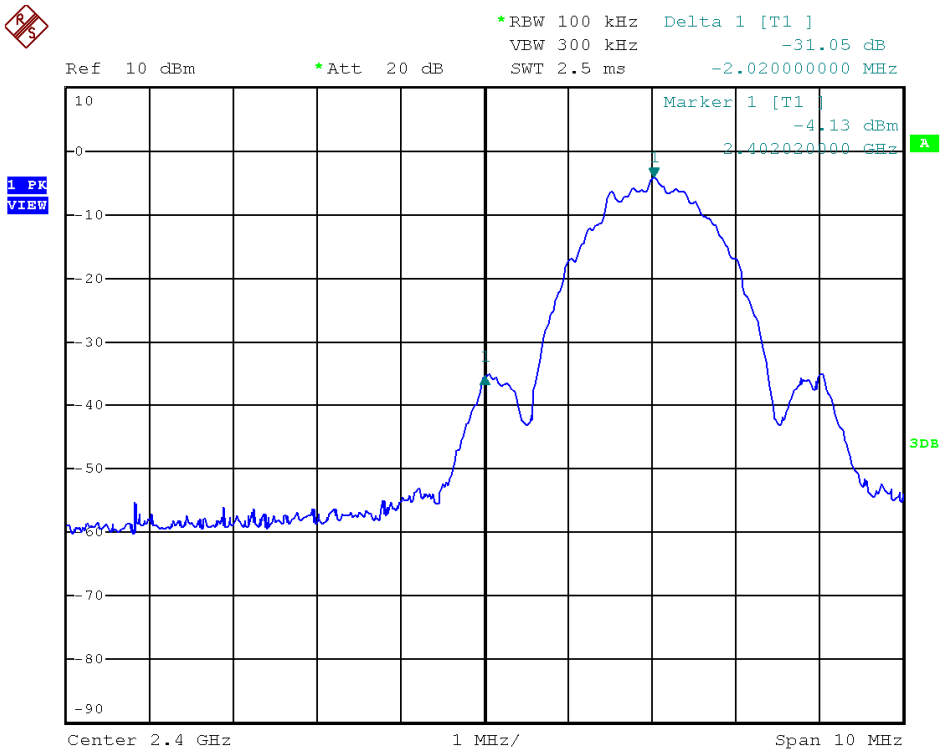
PEAK MEASUREMENT (Bluetooth 1M)

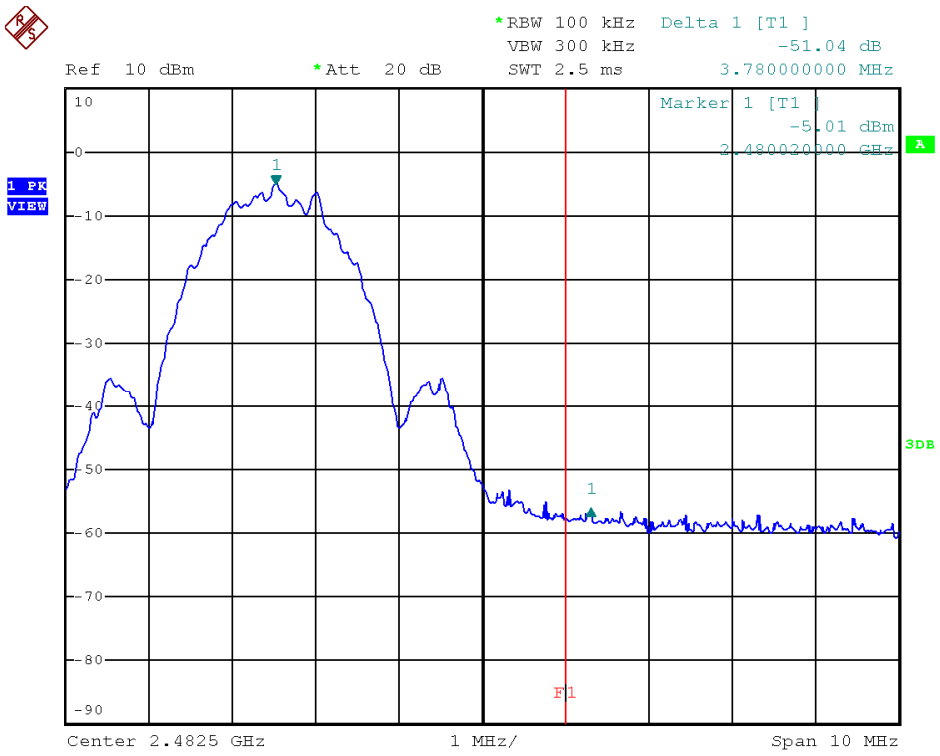




TEST REPORT

PEAK MEASUREMENT (Bluetooth 2M)





TEST REPORT

PEAK MEASUREMENT (Bluetooth 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

= 93.8 dBµV/m - 51.3 dB
= 42.5 dBµV/m

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

= 80.2 dBµV/m - 51.3 dB
= 28.9 dBµV/m

Upper Bandedge

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

= 93.2 dBµV/m - 53.5 dB
= 39.7 dBµV/m

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

= 78.5 dBµV/m - 53.5 dB
= 25.0 dBµV/m

The resultant field strength meets the general radiated emission limit in Section 15.209 / RSS-210 4.4 , which does not exceed 74 dBµV/m (Peak Limit) and 54 dBµV/m (Average Limit).

TEST REPORT

PEAK MEASUREMENT (Bluetooth 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

= 96.8 dBµV/m - 31.1 dB
= 65.7 dBµV/m

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

= 84.8 dBµV/m - 31.1 dB
= 53.7 dBµV/m

Upper Bandedge

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

= 95.8 dBµV/m - 51.0 dB
= 44.8 dBµV/m

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

= 82.8 dBµV/m - 51.0 dB
= 31.8 dBµV/m

The resultant field strength meets the general radiated emission limit in Section 15.209 / RSS-210 4.4, which does not exceed 74 dBµV/m (Peak Limit) and 54 dBµV/m (Average Limit).

TEST REPORT

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

The average factor is not applicable for this device as the transmitted signal is a continuously signal.

TEST REPORT

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.

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).

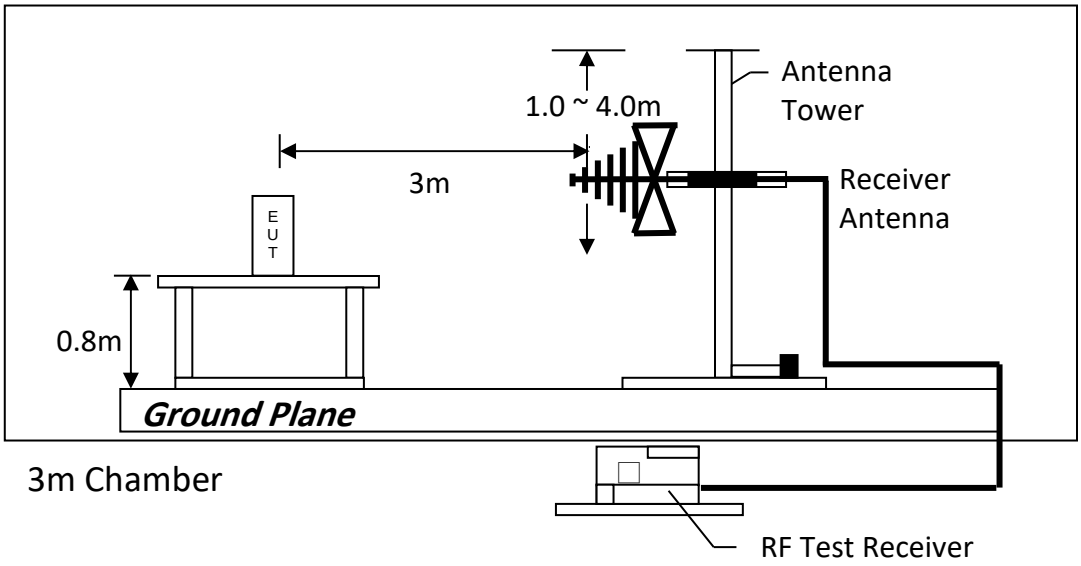
The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion 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.

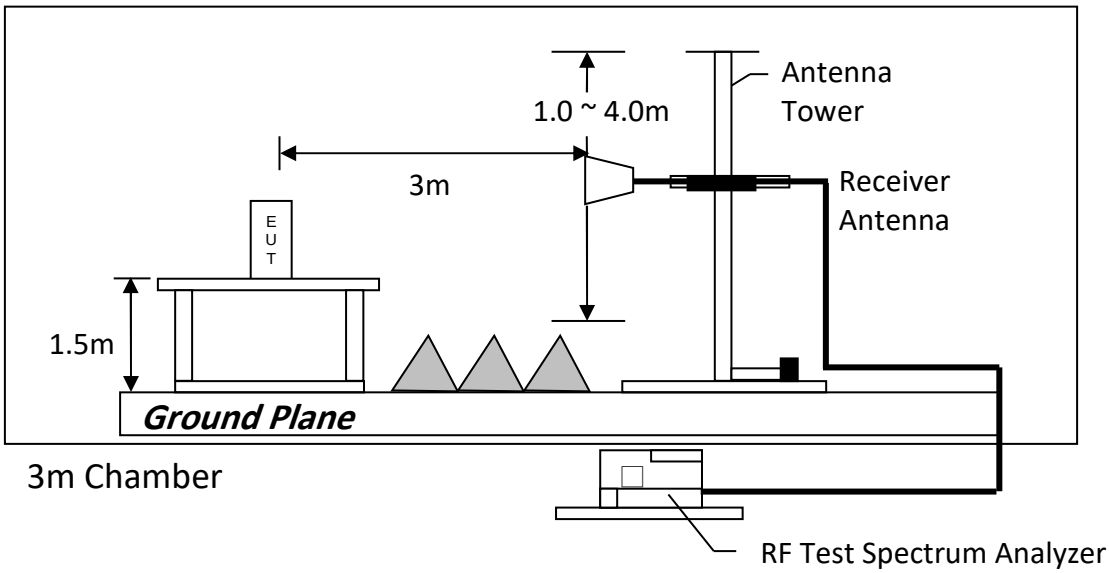
TEST REPORT

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 up to 1GHz



Test setup of radiated emissions above 1GHz

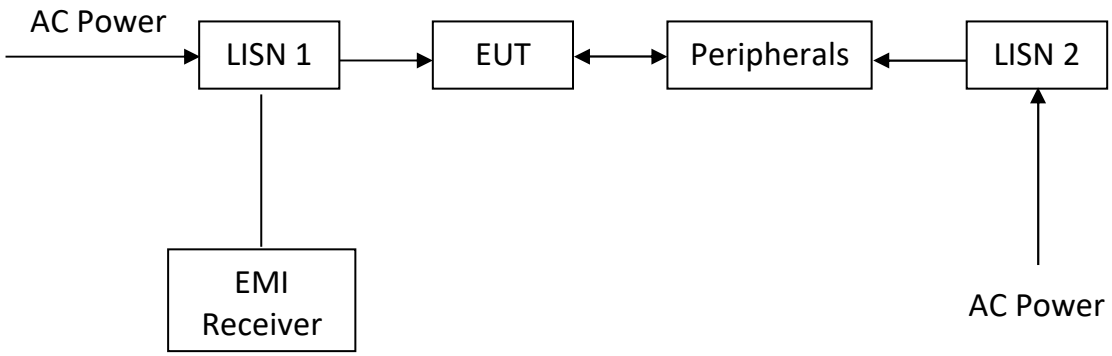
TEST REPORT

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



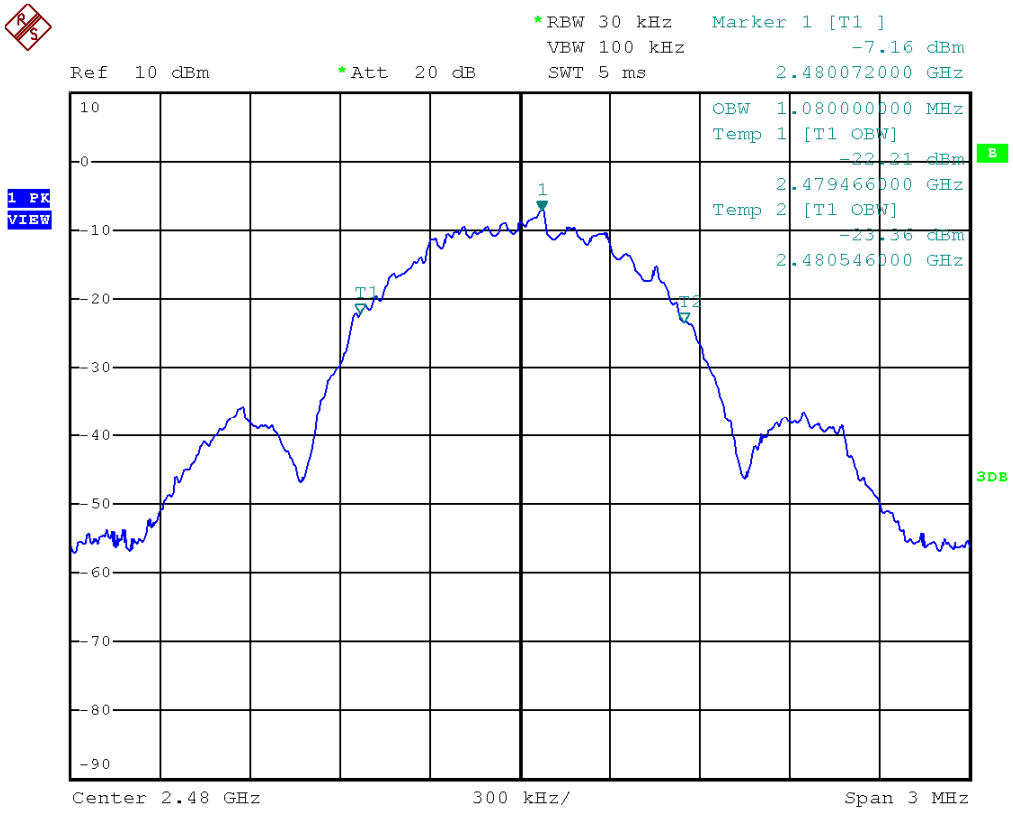
TEST REPORT

8.5 Occupied Bandwidth

Occupied Bandwidth Results: (Bluetooth 1M)

Frequency (MHz)	Occupied Bandwidth (kHz)
Low Channel: 2402	1062
Middle Channel: 2442	1062
High Channel: 2480	1080

The worst case is shown as below:



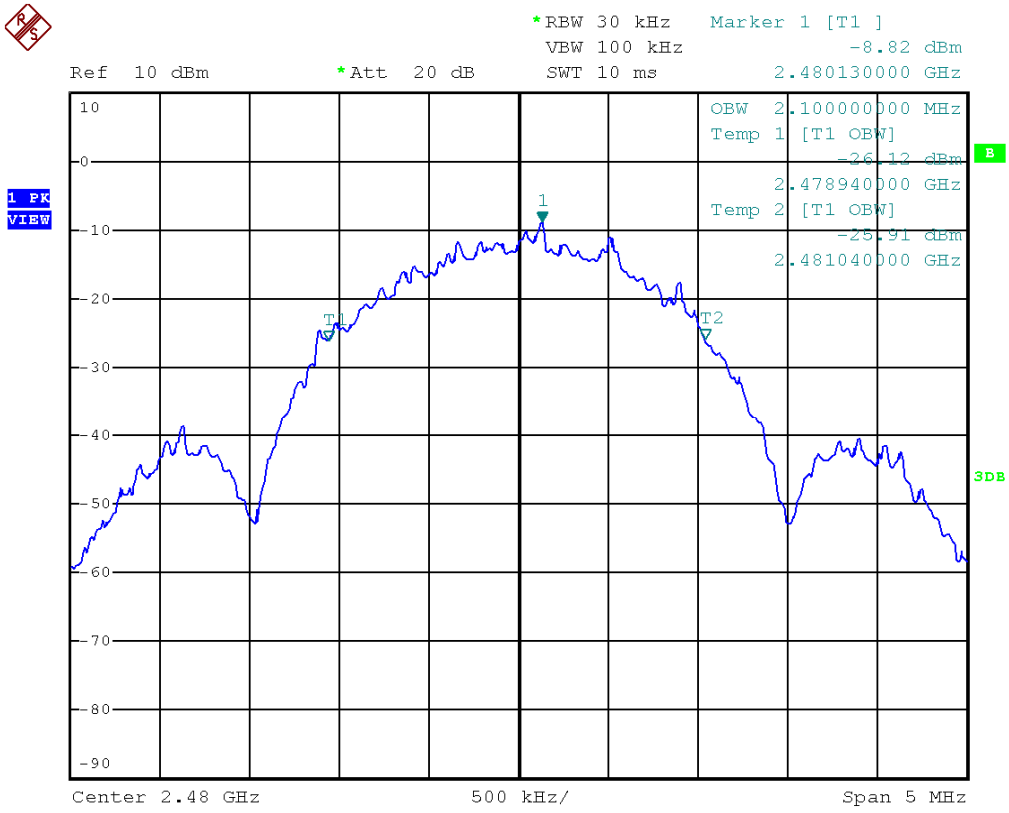
TEST REPORT

8.5 Occupied Bandwidth (Cont'd)

Occupied Bandwidth Results: (Bluetooth 2M)

Frequency (MHz)	Occupied Bandwidth (kHz)
Low Channel: 2402	2080
Middle Channel: 2442	2100
High Channel: 2480	2100

The worst case is shown as below:



TEST REPORT

9.0 CONFIDENTIALITY REQUEST

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

10.0 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	Signal and Spectrum Analyzer (10Hz to 40GHz)	Biconical Antenna (30MHz to 300MHz)	EMI Test Receiver 7GHz
Registration No.	EW-3016	EW-3242	EW-3481
Manufacturer	ROHDESCHWARZ	EMCO	ROHDESCHWARZ
Model No.	FSV40	3110C	ESR7
Calibration Date	January 29, 2022	May 26, 2021	December 21, 2021
Calibration Due Date	January 29, 2023	May 26, 2023	March 21, 2023

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna	Active Loop H-field (9kHz to 30MHz)
Registration No.	EW-3243	EW-1133	EW-3302
Manufacturer	EMCO	EMCO	EMCO
Model No.	3148B	3115	6502
Calibration Date	June 03, 2021	May 26, 2021	June 08, 2022
Calibration Due Date	December 30, 2022	February 26, 2023	September 08, 2023

Equipment	RF Preamplifier (9kHz to 6000MHz)	2.4GHz Notch Filter	14m Double Shield RF Cable (9kHz - 6GHz)
Registration No.	EW-3006b	EW-3435	EW-2376
Manufacturer	SCHWARZBECK	MICROWAVE	RADIALL
Model No.	BBV9718	N0324413	n m/br56/bnc m 14m
Calibration Date	February 15, 2022	March 16, 2022	January 26, 2022
Calibration Due Date	February 15, 2023	June 16, 2023	January 26, 2023

Equipment	Pyramidal Horn Antenna
Registration No.	EW-0905
Manufacturer	EMCO
Model No.	3160-09
Calibration Date	July 20, 2021
Calibration Due Date	January 20, 2023

TEST REPORT

2) Conducted Emissions Test

Equipment	RF Cable 240cm (RG142) (9kHz to 30MHz)	Artificial Mains Network	EMI Test Receiver 7GHz
Registration No.	EW-2454	EW-2874	EW-3481
Manufacturer	RADIALL	ROHDESCHWARZ	ROHDESCHWARZ
Model No.	Bnc m st / 142 / bnc mra 240cm	ENV-216	ESR7
Calibration Date	January 26, 2022	January 24, 2022	December 21, 2021
Calibration Due Date	January 26, 2023	January 24, 2023	March 21, 2023

3) Bandedge Measurement

Equipment	EMI Test Receiver 7GHz	5m RF Cable (40GHz)
Registration No.	EW-3481	EW-2701
Manufacturer	ROHDESCHWARZ	RADIALL
Model No.	ESR7	Sma m-m 5m 40G
Calibration Date	December 21, 2021	November 24, 2021
Calibration Due Date	March 21, 2023	February 24, 2023

4) OBW Measurement

Equipment	EMI Test Receiver 7GHz	5m RF Cable (40GHz)
Registration No.	EW-3481	EW-2701
Manufacturer	ROHDESCHWARZ	RADIALL
Model No.	ESR7	Sma m-m 5m 40G
Calibration Date	December 21, 2021	November 24, 2021
Calibration Due Date	March 21, 2023	February 24, 2023

5) Control Software for Radiated Emission

Software Information	
Software Name	EMC32
Manufacturer	ROHDESCHWARZ
Software version	10.50.40

END OF TEST REPORT