Schneider Electric Systems USA Inc.

TEST REPORT

SCOPE OF WORK
FCC PART 15.247 CLASS II PERMISSIVE CHANGE – IAN-BLE (Bluetooth Low Energy)

REPORT NUMBER
103836530BOX-011

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Non-Specific Radio Report Shell Rev. December 2017

EMISSIONS TEST REPORT

(FULL COMPLIANCE)

Report Number: 103836530BOX-011
Project Number: G103836530

Report Issue Date: 02/25/2019
Report Re-issued Date: 05/28/2019

Model(s) Tested: IAN-BLE (Bluetooth Low Energy, FCC ID: 2ASO7IANBLE and IC: 24835-IANBLE)
Model(s) Partially Tested: None
Model(s) Not Tested but declared equivalent by the client: None

Standards: CFR47 FCC Part 15.247 Subpart C: 02/2019,
CFR47 FCC Part 15 Subpart B: 02/2019,
RSS-247 Issue 2 February 2017,
ICES-003 Issue 6 Published: January 2016 Updated: April 2017,
RSS-Gen Issue 5 April 2018,
RSS-102 Issue 5 March 2015
(Class II Permissive Change – New antenna with higher again, see Appendix for antenna specification)

Tested by:
Intertek Testing Services NA, Inc.
70 Codman Hill Road
Boxborough, MA 01719
USA

Client:
Schneider Electric Systems USA Inc.
38 Neponset Ave
Foxborough, MA 02035
USA

Report prepared by

Kouma Sinn / EMC Staff Engineer

Report reviewed by

Keith Henderson / EMC Staff Engineer

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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	--
4	Description of Equipment Under Test and Variant Models	--
5	System Setup and Method	--
6	Maximum Peak Output Power Maximum Permissible Exposure CFR47 FCC Part 15 Subpart C:02/2019, Section 15.247 (b)(3) RSS-247 Issue 2 February 2017, RSS-102 Issue 5 March 2015	Pass
7	Band Edge Compliance CFR47 FCC Part 15 Subpart C: 02/2019, Section 15.247 (d) RSS-247 Issue 2: 02/2017)	Pass
8	Transmitter spurious emissions CFR47 FCC Part 15 Subpart C: 02/2019, Section 15.247 (d) RSS-247 Issue 2 February 2017	Pass
9	Digital Device and Receiver Radiated Spurious Emissions CFR47 FCC Part 15 Subpart B 15.109: 02/2019, ICES-003 Issue 6 Published: January 2016 Updated: April 2017	Pass
--	AC Mains Conducted Emissions FCC 47CFR Part 15.107: 02/2019 ICES-003 Issue 6 Published: January 2016 Updated: April 2017	N/A*
10	Antenna Specification	--
11	Revision History	--

*Notes: Not applicable as the EUT powers from internal battery with no connection to AC mains.

3 Client Information

This EUT was tested at the request of:

Client: Schneider Electric Systems USA Inc.
38 Neponset Ave
Foxborough, MA 02035
USA

Contact: Mark Bertolina
Telephone: +1 (866) 438-6275
Fax: None
Email: Mark.Bertolina@se.com

4 Description of Equipment Under Test and Variant Models

Manufacturer: Schneider Electric Systems USA Inc.
38 Neponset Ave
Foxborough, MA 02035
USA

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Central Concentrator	Schneider Electric	IAN-BLE	3016097

Receive Date:	02/14/2019
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
The EUT is an instrument micro network with a long-haul interconnect to a terminal.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
Internal Battery	N/A	N/A	N/A

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmit and Receive

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	Pre-programmed to transmit low, mid, high channels using Hyperterminal
2	Pre-programmed to receive using Hyperterminal

Radio/Receiver Characteristics	
Frequency Band(s)	2402-2480 MHz
Modulation Type(s)	GFSK
Maximum Output Power	Low Channel (2402 MHz): 6.94 dBm (EIRP) Mid Channel (2442 MHz): 7.44 dBm (EIRP) High Channel (2480 MHz): 7.59 dBm (EIRP)
Test Channels	Low Channel (2402 MHz) Mid Channel (2442 MHz) High Channel (2480 MHz)
Occupied Bandwidth	Not measured for Class II Permissive Change
Frequency Hopper: Number of Hopping Channels	N/A
Frequency Hopper: Channel Dwell Time	N/A
Frequency Hopper: Max interval between two instances of use of the same channel	N/A
MIMO Information (# of Transmit and Receive antenna ports)	1
Equipment Type	Standalone
ETSI LBT/Adaptivity	Non-Adaptive
ETSI Adaptivity Type	N/A
ETSI Temperature Category (I, II, III)	N/A
ETSI Receiver Category (1, 2, 3)	3
Antenna Type and Gain	Patch Antenna, 5 dBi

Variant Models:

The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

None

5 System Setup and Method

Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
--	None	--	--	--	--

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None	--	--	--

5.1 Method:

Configuration as required by Configuration as required by FCC Part 15 Subpart C 15.247: 02/2019, FCC Part 15 Subpart B: 02/2019, RSS 247 Issue 2: 02/2017, ICES 003 Issue 6: 01/2016 updated 06/2016, ANSI C 63.10: 2013 and ANSI C 63.4: 2014.

5.2 EUT Block Diagram:

6 Maximum Peak Output Power and Maximum Permissible Exposure

6.1 Results:

The sample tested was found to Comply.

§15.247 (b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt or 30 dBm.

The output power (EIRP) calculation was based on the original maximum output power and the new antenna gain of 5 dBi.

EUT Maximum EIRP = Conducted power + Antenna gain in dBi

EUT Maximum EIRP @ 2402 MHz = 1.94 dBm + 5 dBi
= 6.94 dBm or 4.943 mW
EUT Maximum EIRP @ 2440 MHz = 2.44 dBm + 5 dBi
= 7.44 dBm or 5.546 mW
EUT Maximum EIRP @ 2480 MHz = 2.59 dBm + 5 dBi
= 7.59 dBm or 5.741 mW

6.2 Limit for Maximum Permissible Exposure (MPE)

FCC Human RF Exposure Limits:

The human RF exposure was calculated based on the summation of the EIRP output of the three radios. The FCC §1.1310 The criteria listed in table 1 was used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices shall be evaluated according to the provisions of §2.1093 of this chapter.

Part §1.1310 Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	$*900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	$*180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

(1) Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when a person is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure. The phrase *fully aware* in the context of applying these exposure limits means that an exposed person has received written and/or verbal information fully explaining the potential for RF exposure resulting from his or her employment. With the exception of *transient* persons, this phrase also means that an exposed person has received appropriate training regarding work practices relating to controlling or mitigating his or her exposure. Such training is not required for *transient* persons, but they must receive written and/or verbal information and notification (for example, using signs) concerning their exposure potential and appropriate means available to mitigate their exposure. The phrase *exercise control* means that an exposed person is allowed to and knows how to reduce or avoid exposure by administrative or engineering controls and work practices, such as use of personal protective equipment or time averaging of exposure.

(2) General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

RSS-102 Issue 5 Exposure Limits:

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
0.003-10^{21}	83	90	-	Instantaneous*
0.1-10	-	$0.73/f$	-	6**
1.1-10	$87/f^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	$58.07/f^{0.25}$	$0.1540/f^{0.25}$	$8.944/f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142f^{0.3417}$	$0.008335f^{0.3417}$	$0.02619f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

Note: f is frequency in MHz.
*Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

Test Procedure

An MPE evaluation was performed in order to show that the device was compliant with §2.1091. The maximum power density was calculated for each transmitter at a separation distance of 20 cm. The original maximum conducted output power and the new antenna gain of 5 dBi were used to calculate the maximum power density.

For each transmitter the maximum power RF exposure at a 20 cm distance using the formula:

$\text{Conducted Power}_{mW} = 10^{\text{ConductedPower(dBm)}/10}$

$\text{Power Density} = [\text{Conducted Power}_{mW} \times \text{Ant.Gain}] / [4\pi \times (20_{cm})^2]$ or $[\text{EIRP}] / [4\pi \times (20_{cm})^2]$

Results:

EUT Maximum EIRP = Conducted power + Antenna gain in dBi

EUT Maximum EIRP @ 2402 MHz = 1.94 dBm + 5 dBi
= 6.94 dBm or 4.943 mW
EUT Maximum EIRP @ 2440 MHz = 2.44 dBm + 5 dBi
= 7.44 dBm or 5.546 mW
EUT Maximum EIRP @ 2480 MHz = 2.59 dBm + 5 dBi
= 7.59 dBm or 5.741 mW

EUT Power Density = 5.741/5024 or 0.00114 mW/cm^2 (Used the highest EIRP)

FCC Limit For General Population/Uncontrolled Exposure at 2.4 GHz = 1 mW/cm^2

RSS-102 Limit For General Population/Uncontrolled Exposure at 2.4 GHz = 5.35 W/m^2 or 0.535 mW/cm^2

The calculated maximum power density at 20 cm distance is less than the limit for general population / uncontrolled exposure. The EUT met the requirements.

Test Personnel:	Kouma Sinn KPS	Test Date:	05/22/2019
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	CFR47 FCC Part 15.247 RSS-247, RSS-102	Limit Applied:	See report section 6.3
Input Voltage:	Internal Battery Powered		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	N/A
		Relative Humidity:	N/A
		Atmospheric Pressure:	N/A

Deviations, Additions, or Exclusions: None

7 Band Edge Compliance

7.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C 15.247 RSS 247, ANSI C 63.10, and ANSI C 63.4.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain 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.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

7.2 Test Equipment Used:

Test equipment used on 02/24/2019

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
BAR1'	Digital 4 Line Barometer	Mannix	0ABA116	BAR1	04/30/2018	04/30/2019
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/22/2018	03/22/2019
ETS005'	1-18GHz horn antenna	ETS-Lindgren	3117	00218279	05/14/2018	05/14/2019
145-416'	Cables 145-420 145-423 145-425 145-408	Huber + Suhner	3m Track B cables	multiple	07/25/2018	07/25/2019

Software Utilized:

Name	Manufacturer	Version
None	--	--

Test equipment used on 05/22/2019

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV002'	Weather Station	Davis Instruments	7400	PE80519A93	06/21/2018	06/21/2019
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/28/2019	03/28/2020
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	06/08/2018	06/08/2019
145-416'	Cables 145-420 145-423 145-425 145-408	Huber + Suhner	3m Track B cables	multiple	07/25/2018	07/25/2019

Software Utilized:

Name	Manufacturer	Version
None	--	--

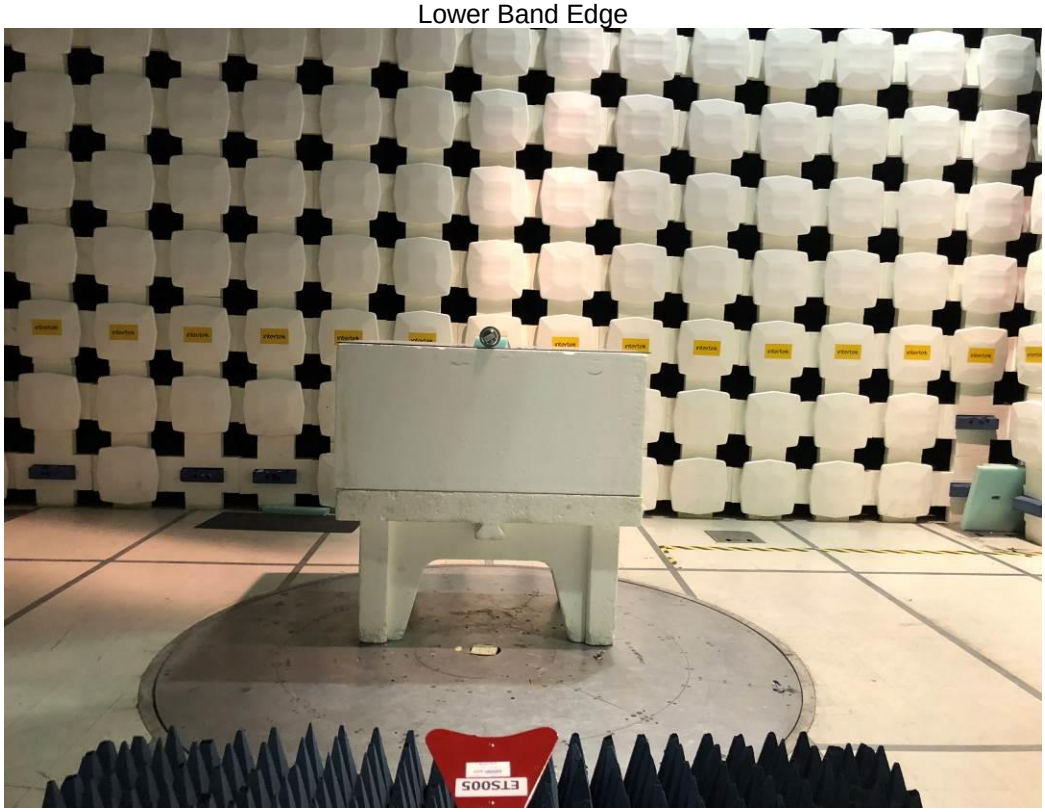
7.3 Results:

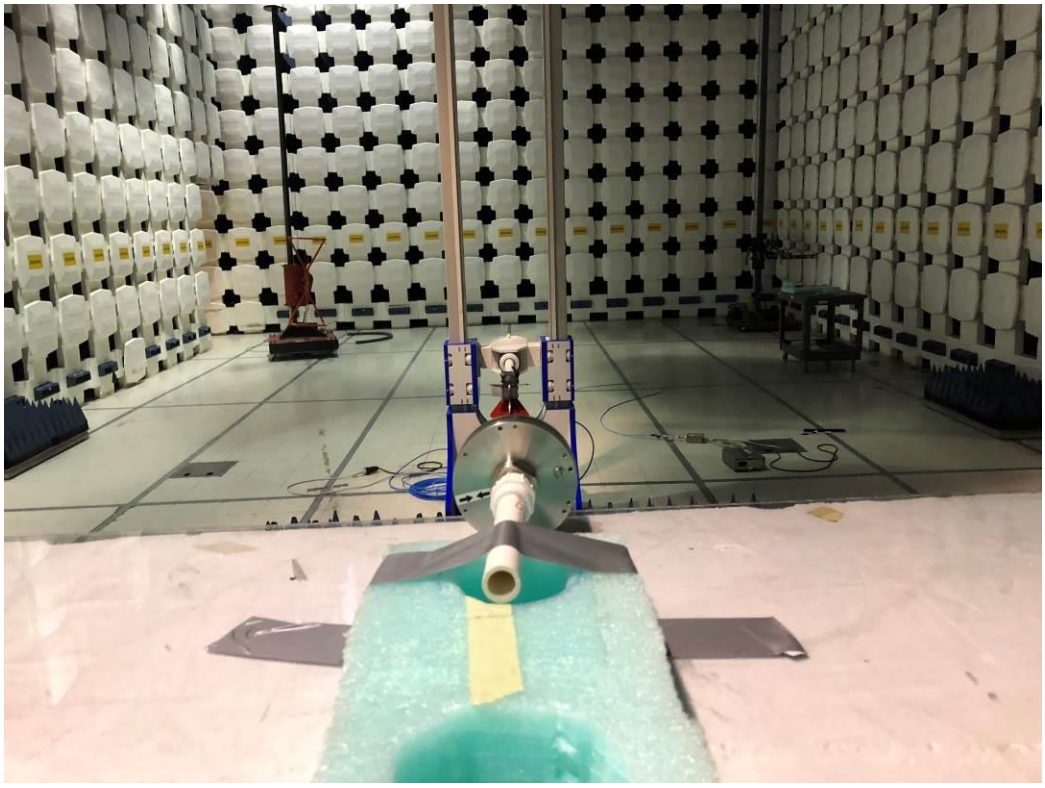
The sample tested was found to Comply.

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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c))

7.4 Setup Photographs:

Lower Band Edge



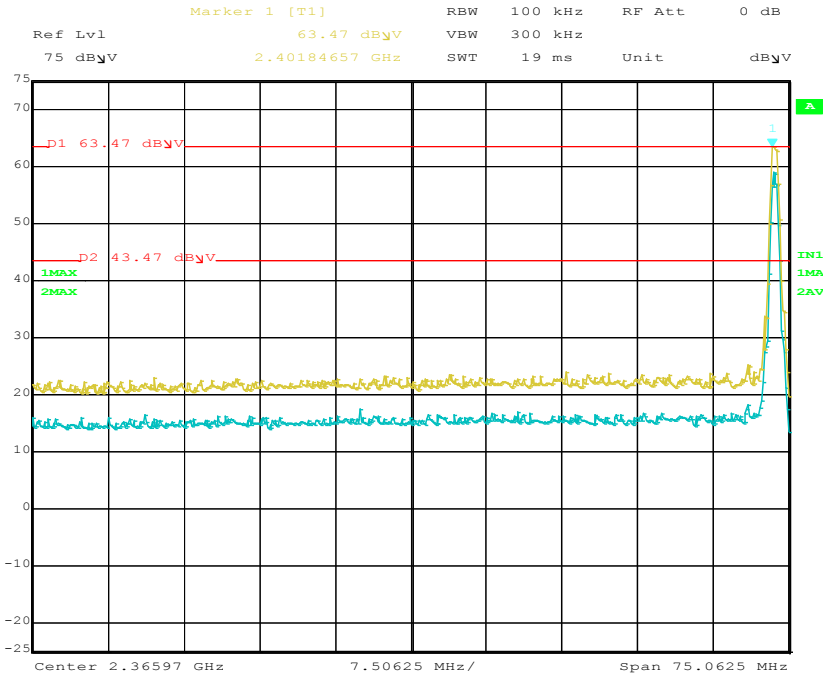


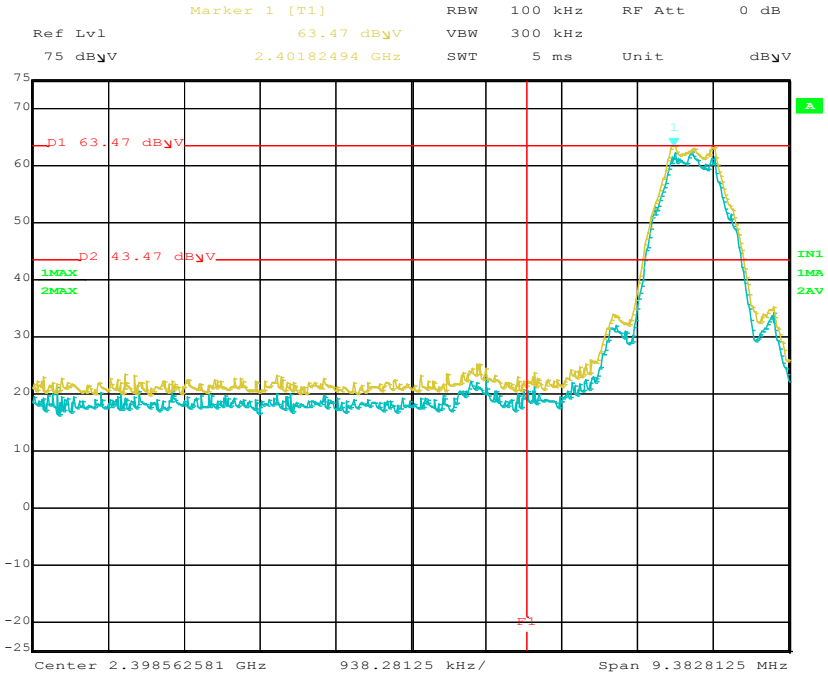
Upper Band Edge

7.5 Plots/Data:

Worst-case with receiving antenna in horizontal and EUT on its side at 3 meters distance

Lower Band Edge

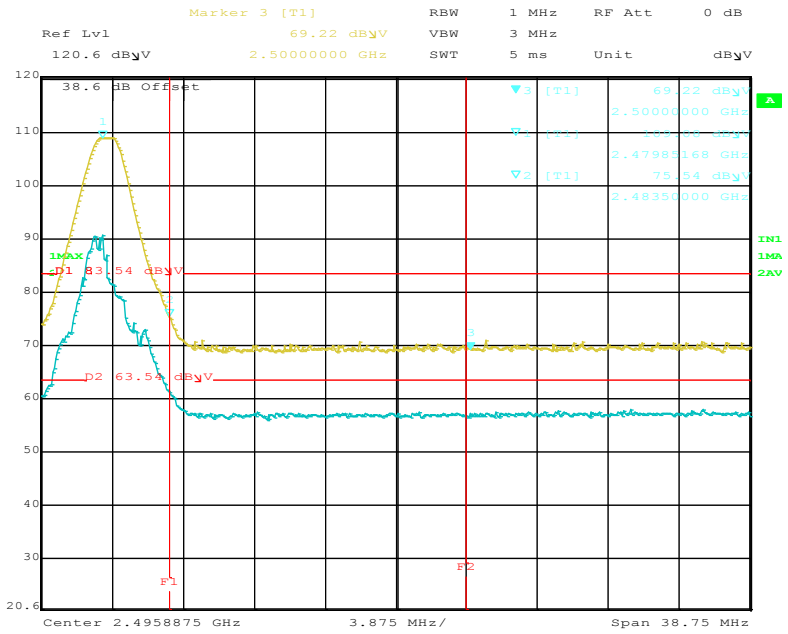




Worst-case with receiving antenna in horizontal and EUT on its side at 1 meter distance

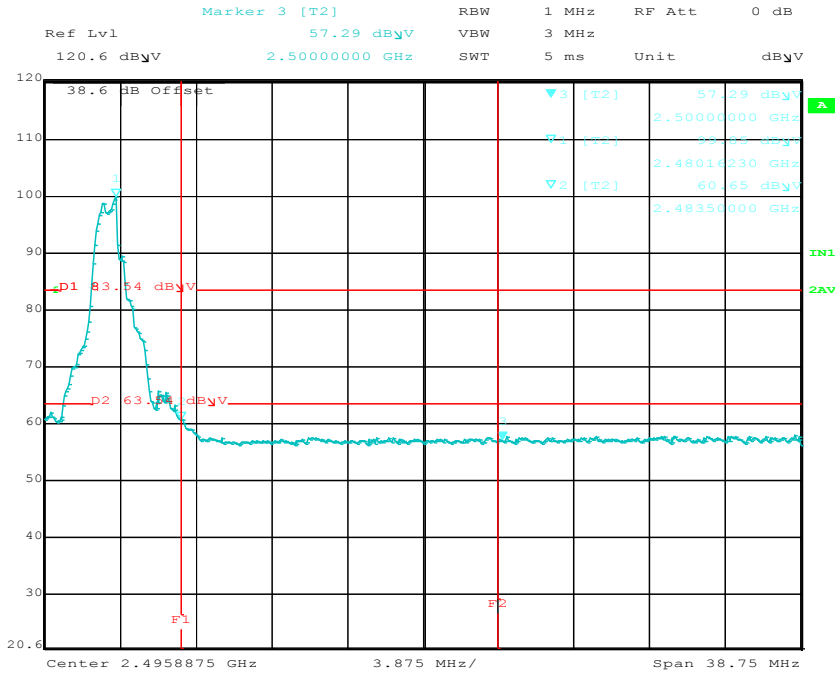
Upper Band Edge – Peak Reading

Peak Limit at 1 meter = 74dBuV/m + 9.54dB (distance factor from 1 to 3 meters) = 83.54 dBuV/m



Upper Band Edge – Average Reading

Average Limit at 1 meter = 54dBuV/m + 9.54dB (distance factor from 1 to 3 meters) = 63.54 dBuV/m



Test Personnel:	Kouma Sinn KPS	Test Date:	02/24/2019, 05/22/2019
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	CFR47 FCC Part 15.247 RSS-247	Limit Applied:	See report section 7.3
Input Voltage:	Internal Battery Powered		
Pretest Verification w/ Ambient Signals or BB Source:	BB Source	Ambient Temperature:	22, 23 ºC
		Relative Humidity:	8, 41 %
		Atmospheric Pressure:	1023, 998 mbars

Deviations, Additions, or Exclusions: None

8 Transmitter spurious emissions

8.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C 15.247, FCC Part 15 Subpart B, RSS 247 ICES 003, ANSI C 63.10, and ANSI C 63.4.

TEST SITE: EMC Lab & 10m ALSE

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain 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.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

Alternately, when BAT-EMC Emission Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. The “Correction” includes Antenna Factor, Preamp, and Cable Loss. These are already accounted for in the “Level” column.

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
BAR1'	Digital 4 Line Barometer	Mannix	0ABA116	BAR1	04/30/2018	04/30/2019
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/22/2018	03/22/2019
145-410'	Cables 145-420 145-421 145-422 145-406	Huber + Suhner	10m Track A Cables	multiple	07/25/2018	07/25/2019
PRE11'	50dB gain pre-amp	Keith H	PRE11	PRE11	10/27/2018	10/27/2019
145145'	Broadband Hybrid Antenna 30 MHz - 3 GHz	Sunol Sciences Corp.	JB3	A122313	05/16/2018	05/16/2019
ETS005'	1-18GHz horn antenna	ETS-Lindgren	3117	00218279	05/14/2018	05/14/2019
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	06/14/2018	06/14/2019
REA008'	band reject filter 2.4GHz	Reactel, Inc	12RX7-2441.75-x140 S	17-01	07/13/2018	07/13/2019
145-416'	Cables 145-420 145-423 145-425 145-408	Huber + Suhner	3m Track B cables	multiple	07/25/2018	07/25/2019
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	10/26/2018	10/26/2019
REA005'	1.5GHz High Pass Filter	Reactel, Inc	7HS-1.5G/15G-S11	06-1	02/22/2018	02/22/2019
CBLSHF204'	Cable, SMA - SMA, 9kHz -40GHz, (Cable Kit 5)	Huber + Suhner	Sucoflex 102EA	234714001	11/15/2018	11/15/2019
145130'	Cable,SMA-SMA,1 meter,9kHz-40GHz, (Cable Kit 6)	Huber+Suhner	Sucoflex 102EA	3153/2EA	09/13/2018	09/13/2019
PRE9'	100MHz-40GHz Preamp	MITEQ	NSP4000-NFG	1260417	09/14/2018	09/14/2019

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	3.17.0.3
EMI Boxborough.xls	Intertek	08/27/2010

8.3 Results:

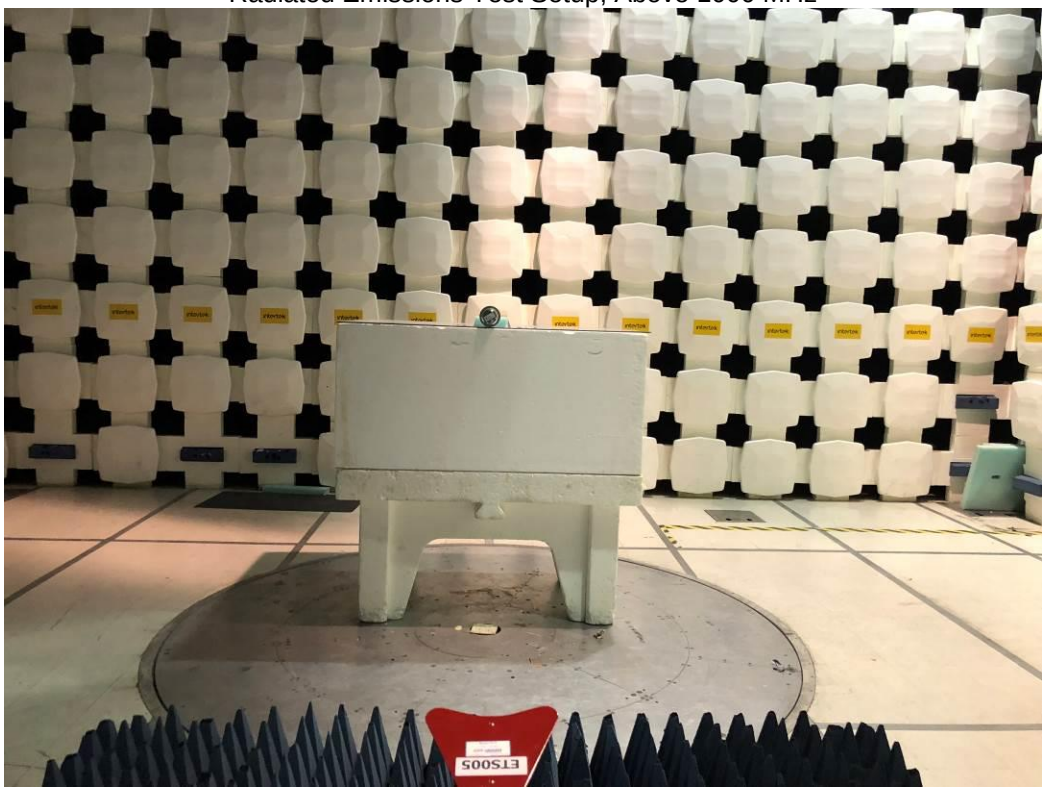
The sample tested was found to Comply.

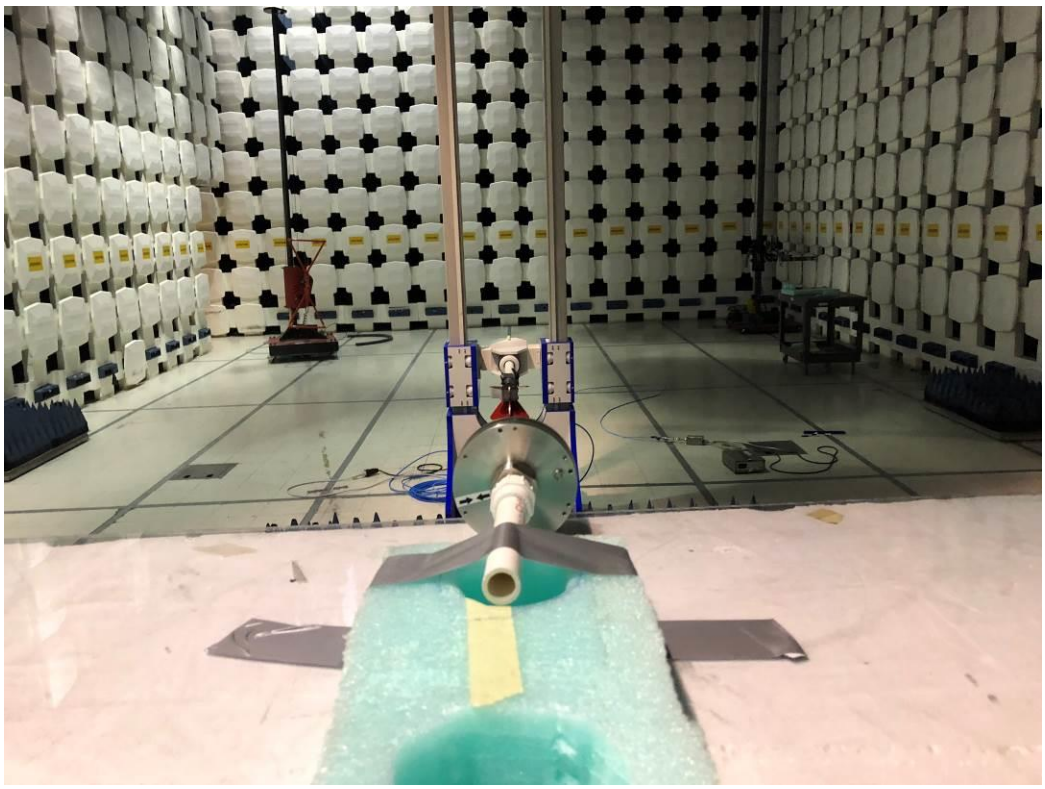
15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that 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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c))

8.4 Setup Photographs:

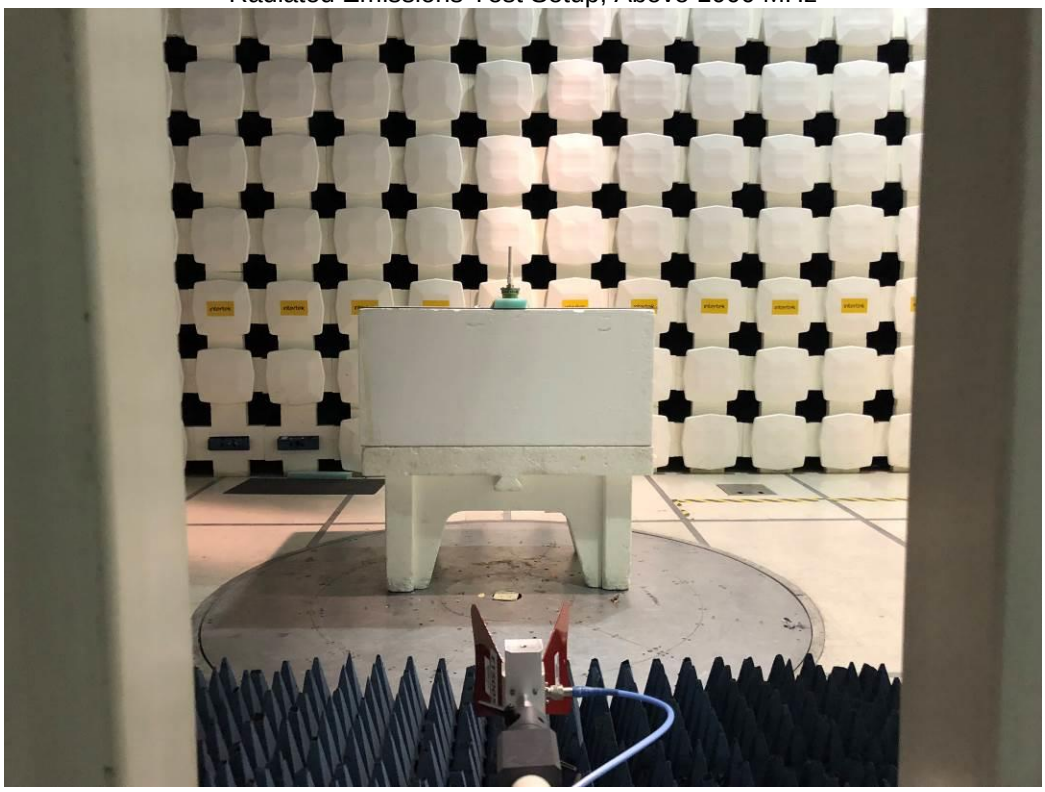
Radiated Emissions Test Setup, 30-1000 MHz

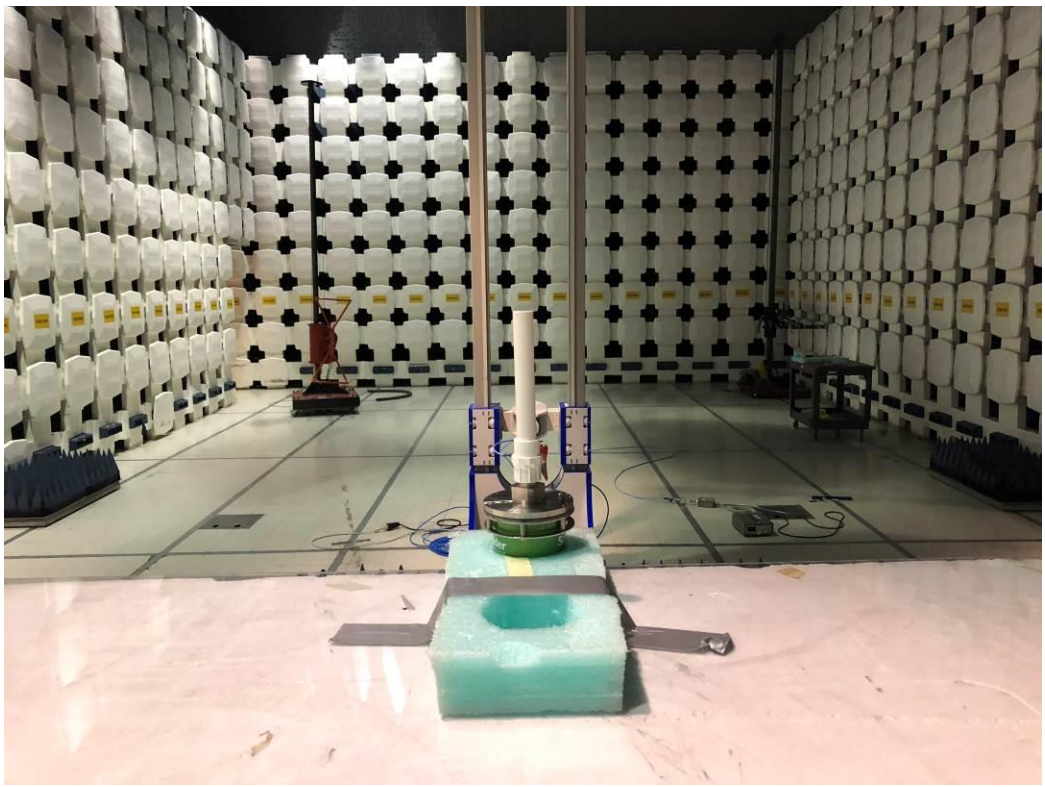
Radiated Emissions Test Setup, Above 1000 MHz



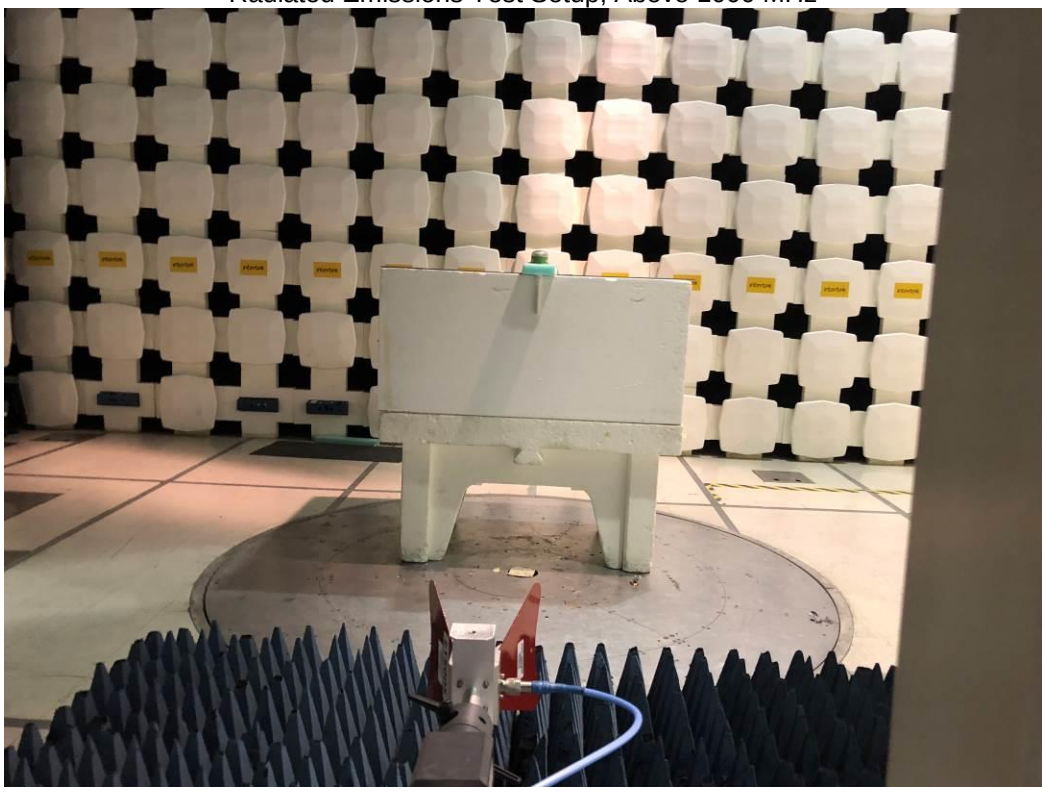


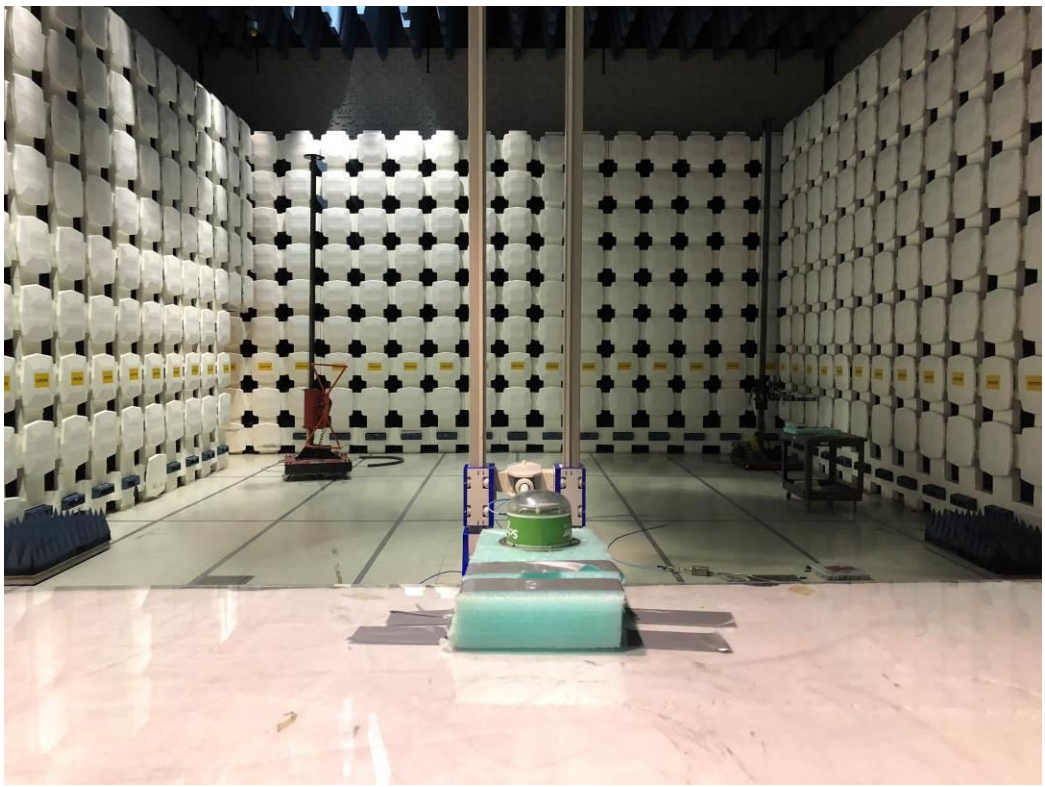
Radiated Emissions Test Setup, Above 1000 MHz



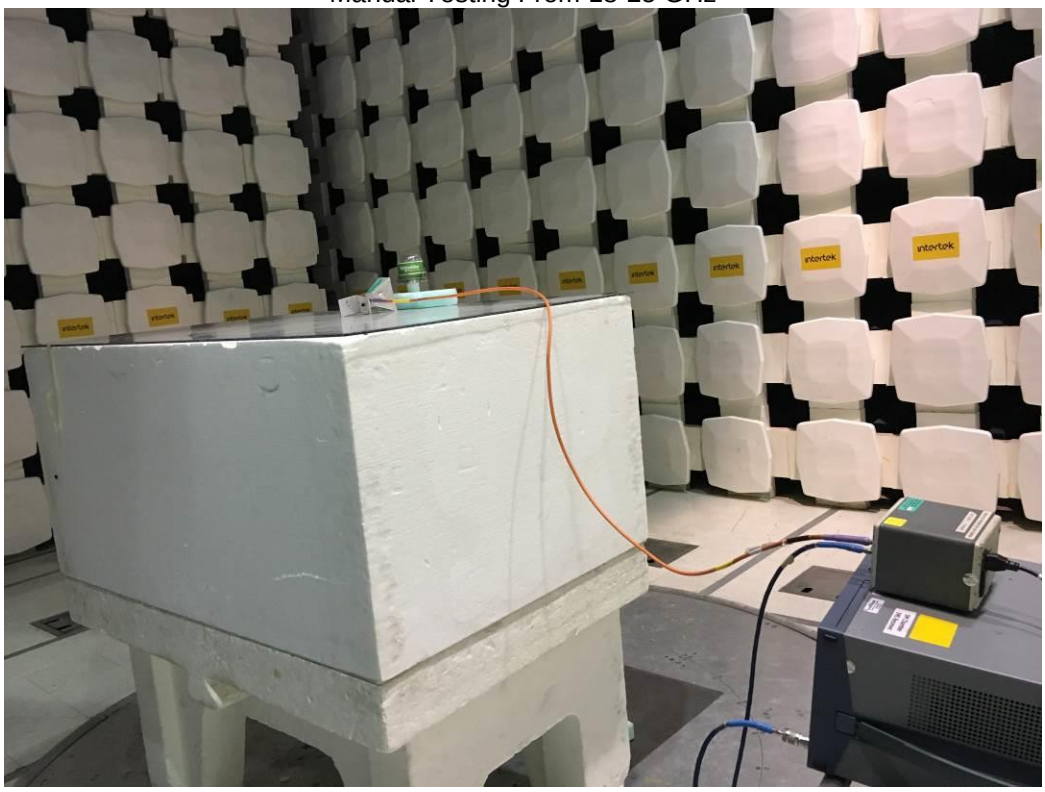


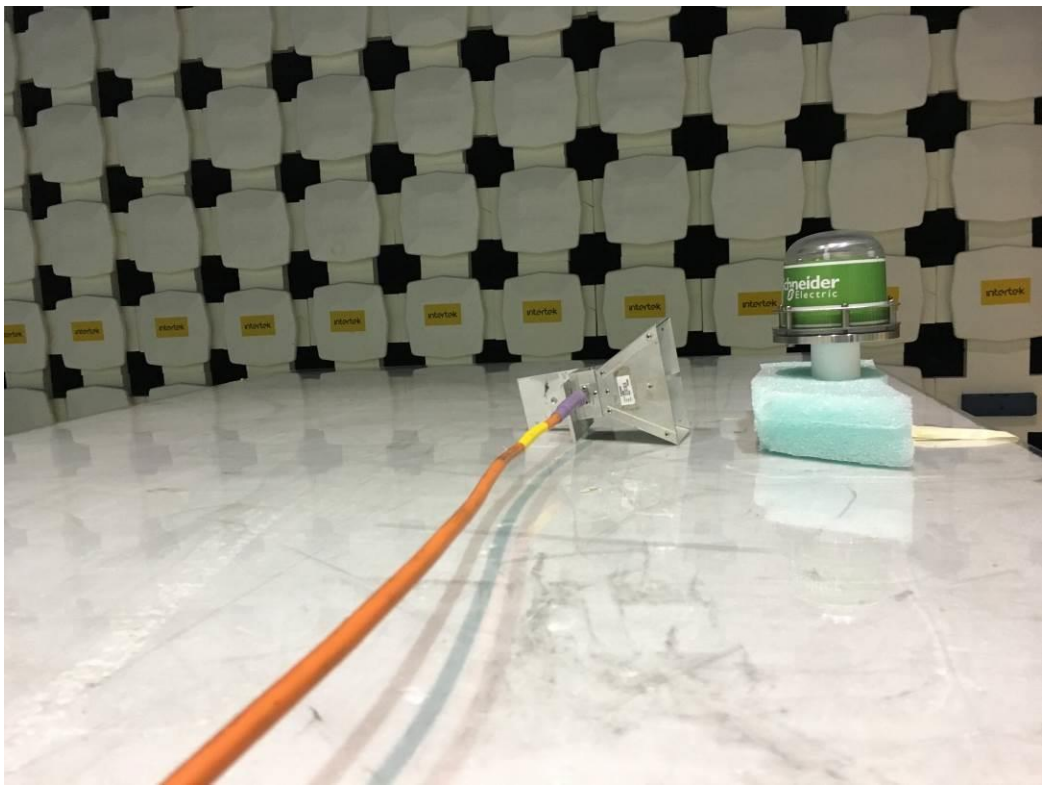
Radiated Emissions Test Setup, Above 1000 MHz





Manual Testing From 18-25 GHz





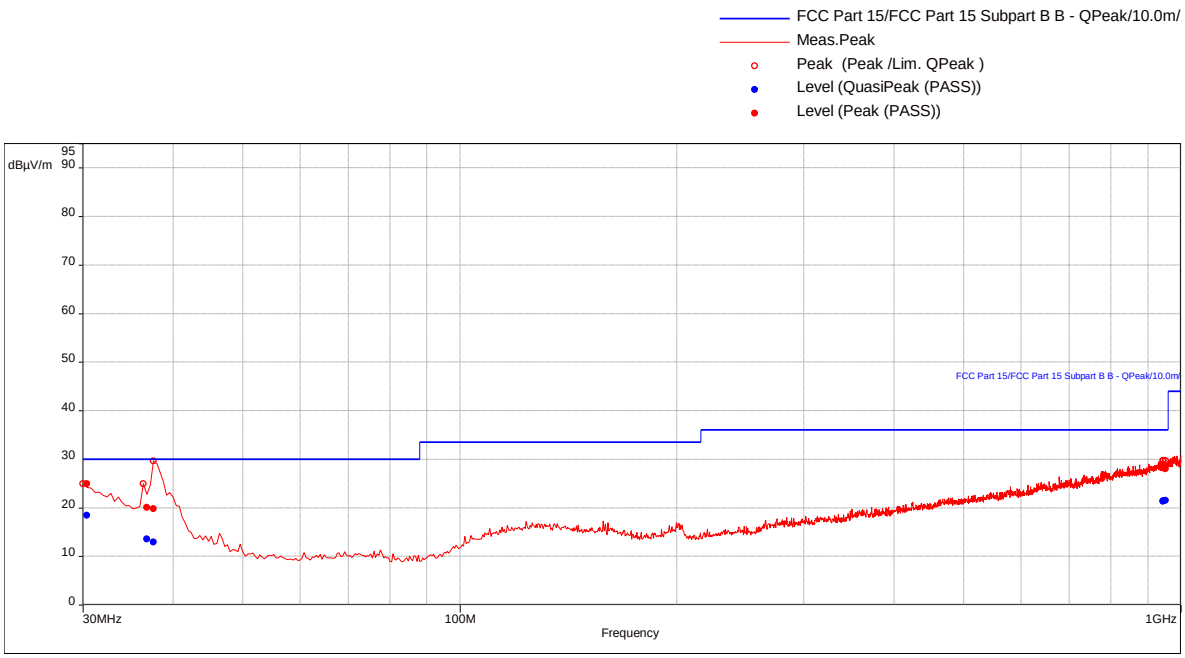
8.5 Plots/Data:

30-1000MHz, Battery Powered, Transmit @ Low Channel, EUT on X-axis

Test Information:

Date and Time	2/15/2019 6:38:25 PM
Client and Project Number	Schneider Electric_G103836530
Engineer	Vathana Ven
Temperature	21 deg C
Humidity	22%
Atmospheric Pressure	1005 mB
Comments	RE 30-1000MHz_Battery_Tx mode_Low channel_X-Axis

Graph:



Results:

QuasiPeak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
30.26842105	18.43	30.00	-11.57	10.00	2.36	Vertical	120000.00	-11.16
36.74736842	13.54	30.00	-16.46	61.00	1.96	Vertical	120000.00	-16.14
37.75789474	12.92	30.00	-17.08	33.00	2.32	Vertical	120000.00	-16.95
944.5789474	21.36	36.00	-14.64	262.00	2.33	Horizontal	120000.00	-4.73
946.0736842	21.41	36.00	-14.59	359.00	3.73	Horizontal	120000.00	-4.68
951.8421053	21.48	36.00	-14.52	48.00	2.58	Horizontal	120000.00	-4.54

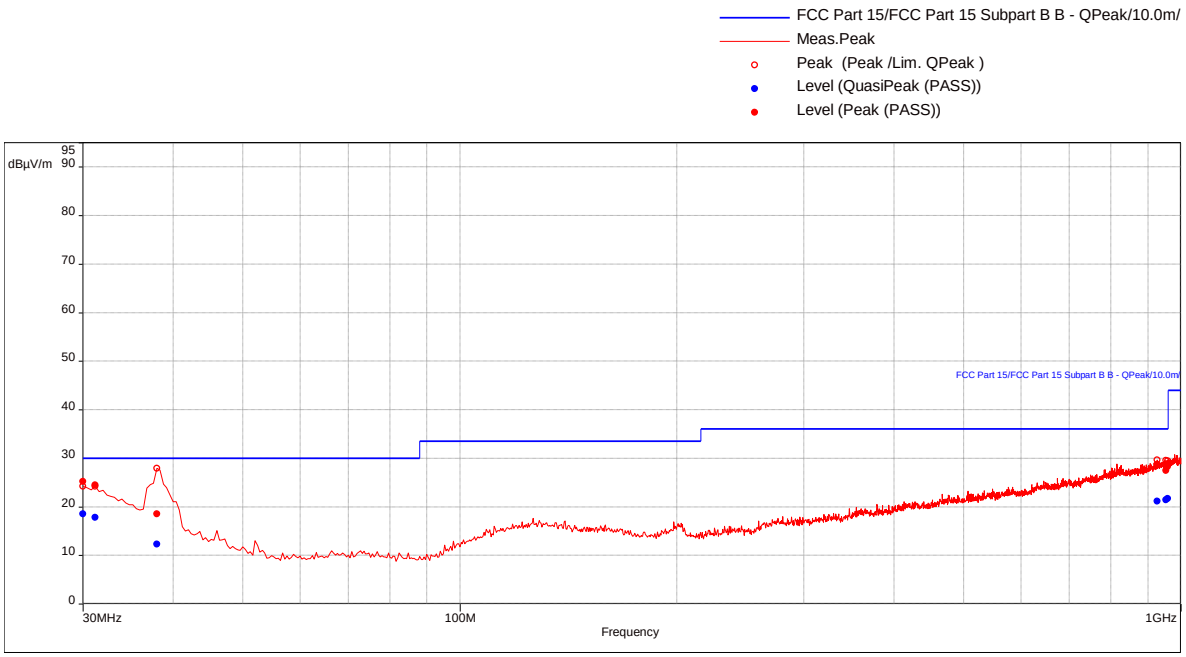
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

30-1000MHz, Battery Powered, Transmit @ Low Channel, EUT on Y-axis

Test Information:

Date and Time	2/15/2019 7:23:26 PM
Client and Project Number	Schneider Electric_G103836530
Engineer	Vathana Ven
Temperature	21 deg C
Humidity	22%
Atmospheric Pressure	1005 mB
Comments	RE 30-1000MHz_Battery_Tx mode_Low channel_Y-Axis

Graph:



Results:

(PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
30.17368421	18.50	30.00	-11.50	92.00	3.59	Horizontal	120000.00	-11.08
31.07368421	17.80	30.00	-12.20	345.00	2.39	Horizontal	120000.00	-11.79
37.90526316	12.27	30.00	-17.73	218.00	1.38	Vertical	120000.00	-17.07
927.6	21.15	36.00	-14.85	232.00	2.28	Horizontal	120000.00	-4.94
953.4736842	21.41	36.00	-14.59	0.00	1.74	Horizontal	120000.00	-4.53
959.0736842	21.70	36.00	-14.30	187.00	2.32	Horizontal	120000.00	-4.39

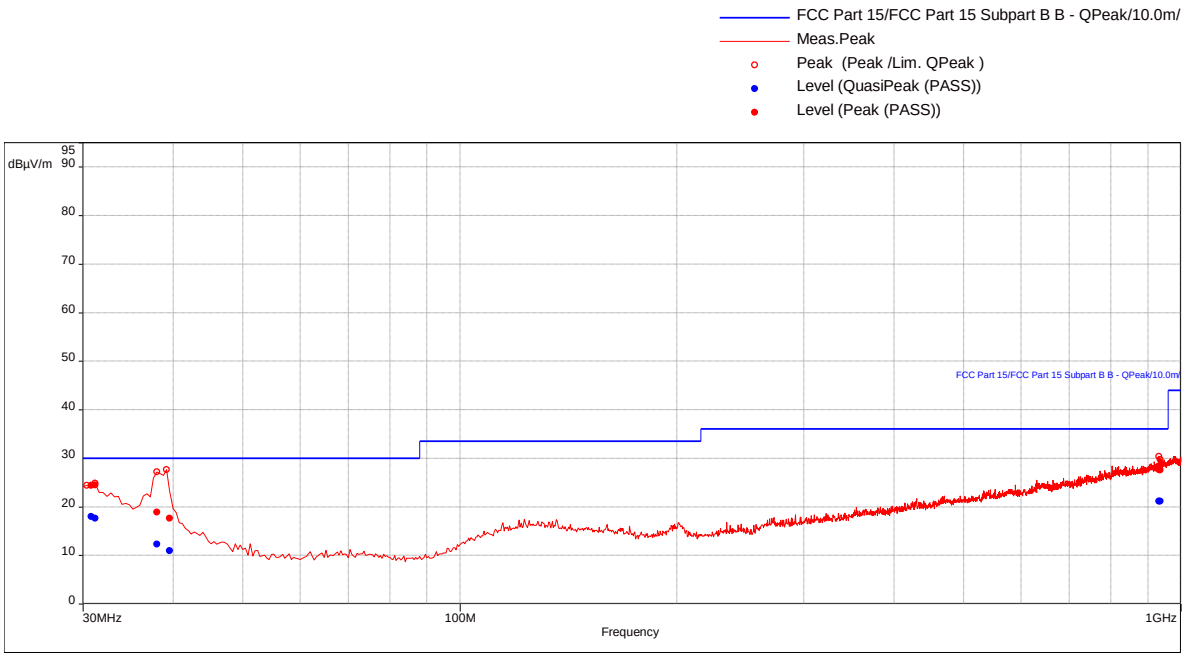
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

30-1000MHz, Battery Powered, Transmit @ Low Channel, EUT on Z-axis

Test Information:

Date and Time	2/15/2019 8:07:31 PM
Client and Project Number	Schneider Electric_G103836530
Engineer	Vathana Ven
Temperature	21 deg C
Humidity	22%
Atmospheric Pressure	1005 mB
Comments	RE 30-1000MHz_Battery_Tx mode_Low channel_Z-Axis

Graph:



Results:

QuasiPeak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
30.81052632	17.96	30.00	-12.04	269.00	2.83	Horizontal	120000.00	-11.58
31.32631579	17.60	30.00	-12.40	0.00	3.35	Vertical	120000.00	-11.99
37.96842105	12.27	30.00	-17.73	218.00	4.00	Vertical	120000.00	-17.12
39.70526316	10.91	30.00	-19.09	54.00	3.51	Vertical	120000.00	-18.38
932.3368421	21.15	36.00	-14.85	0.00	3.40	Vertical	120000.00	-4.87
935.9263158	21.11	36.00	-14.89	128.00	1.59	Vertical	120000.00	-4.84

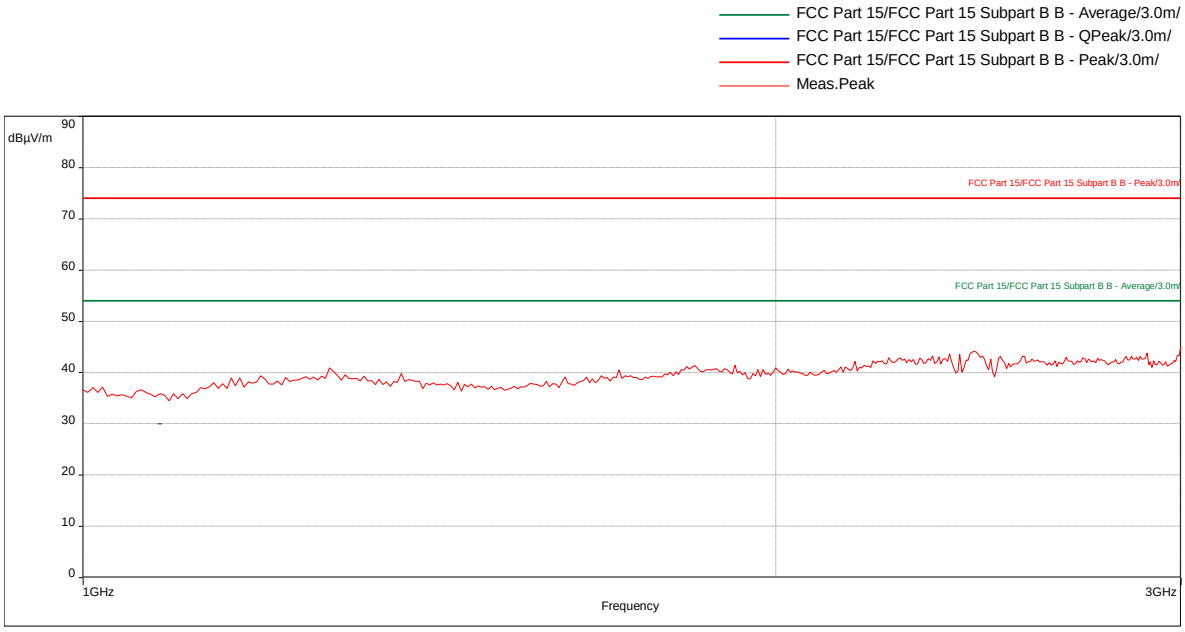
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

1-3 GHz, Battery Powered, Transmit @ Low Channel, EUT on X-axis

Test Information:

Date and Time	2/24/2019 3:15:38 PM
Client and Project Number	Scheider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	984mbar
Comments	Tx Low, EUT on its side

Graph:



Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

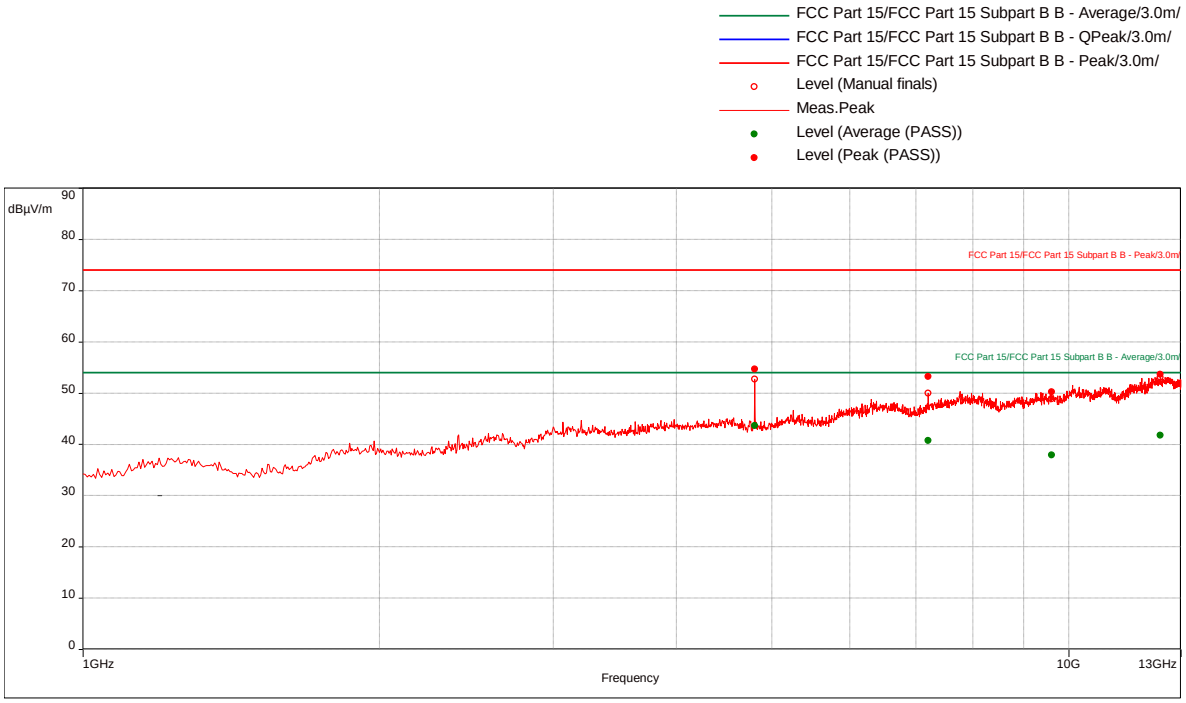
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

3-13 GHz, Battery Powered, Transmit @ Low Channel, EUT on X-axis

Test Information:

Date and Time	2/21/2019 10:23:35 AM
Client and Project Number	Schneider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	1001mbar
Comments	Copy BLE, Tx Low, X-axis (Side), 3-13 GHz

Graph:



Results:

Peak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4803.684211	54.71	74.00	-19.29	47.00	2.50	Horizontal	1000000.00	-11.60
7205.526316	53.25	74.00	-20.75	11.00	1.30	Vertical	1000000.00	-7.65
9613.157895	50.21	74.00	-23.79	92.00	2.25	Vertical	1000000.00	-4.71
12390.78947	53.62	74.00	-20.38	136.00	2.90	Horizontal	1000000.00	0.52

Average (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4803.684211	43.62	54.00	-10.38	47.00	2.50	Horizontal	1000000.00	-11.60
7205.526316	40.75	54.00	-13.25	11.00	1.30	Vertical	1000000.00	-7.65
9613.157895	37.91	54.00	-16.09	92.00	2.25	Vertical	1000000.00	-4.71
12390.78947	41.77	54.00	-12.23	136.00	2.90	Horizontal	1000000.00	0.52

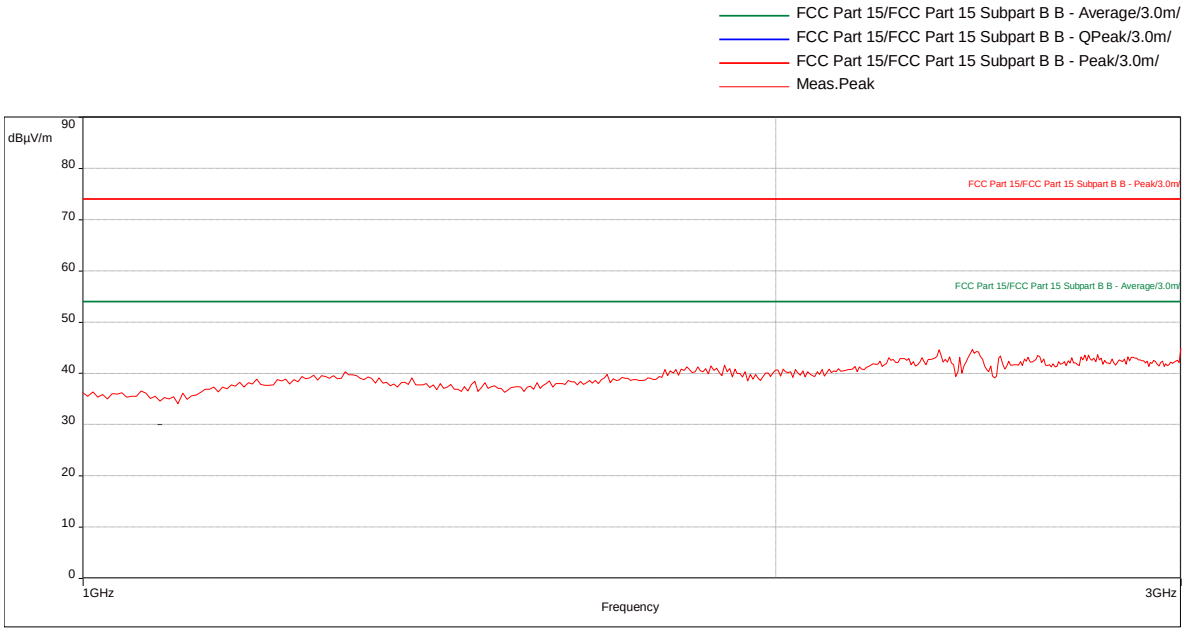
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

1-3 GHz, Battery Powered, Transmit @ Low Channel, EUT on Y-axis

Test Information:

Date and Time	2/24/2019 3:12:54 PM
Client and Project Number	Scheider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	984mbar
Comments	Tx Low, EUT pointing down

Graph:



Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

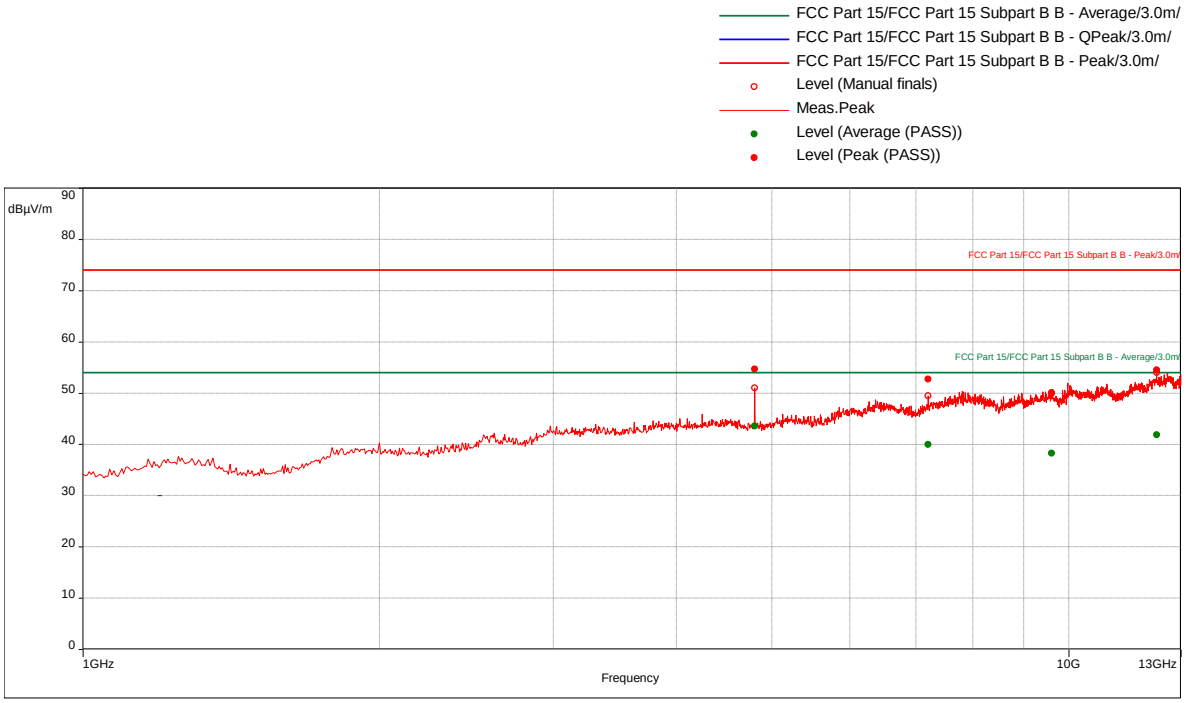
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

3-13 GHz, Battery Powered, Transmit @ Low Channel, EUT on Y-axis

Test Information:

Date and Time	2/21/2019 9:56:28 AM
Client and Project Number	Schneider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	1001mbar
Comments	BLE, Tx Low, Y-axis (Straight down), 3-13 GHz

Graph:



Results:

Peak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4803.684211	54.71	74.00	-19.29	276.00	1.45	Vertical	1000000.00	-11.60
7205.526316	52.74	74.00	-21.26	232.00	1.15	Vertical	1000000.00	-7.65
9608.157895	50.07	74.00	-23.93	85.00	3.98	Vertical	1000000.00	-4.72
12283.15789	54.49	74.00	-19.51	239.00	3.15	Vertical	1000000.00	0.61

Average (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4803.684211	43.58	54.00	-10.42	276.00	1.45	Vertical	1000000.00	-11.60
7205.526316	39.98	54.00	-14.02	232.00	1.15	Vertical	1000000.00	-7.65
9608.157895	38.23	54.00	-15.77	85.00	3.98	Vertical	1000000.00	-4.72
12283.15789	41.85	54.00	-12.15	239.00	3.15	Vertical	1000000.00	0.61

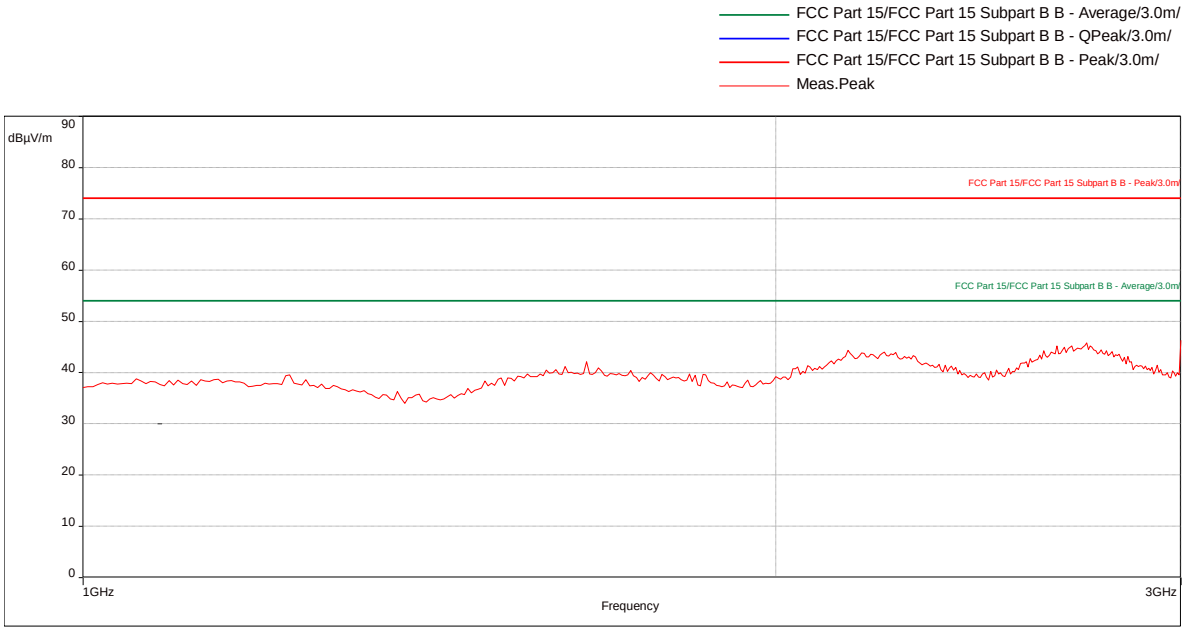
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

1-3 GHz, Battery Powered, Transmit @ Low Channel, EUT on Z-axis

Test Information:

Date and Time	2/24/2019 3:03:30 PM
Client and Project Number	Scheider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	984mbar
Comments	Tx Low, EUT pointing up

Graph:



Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

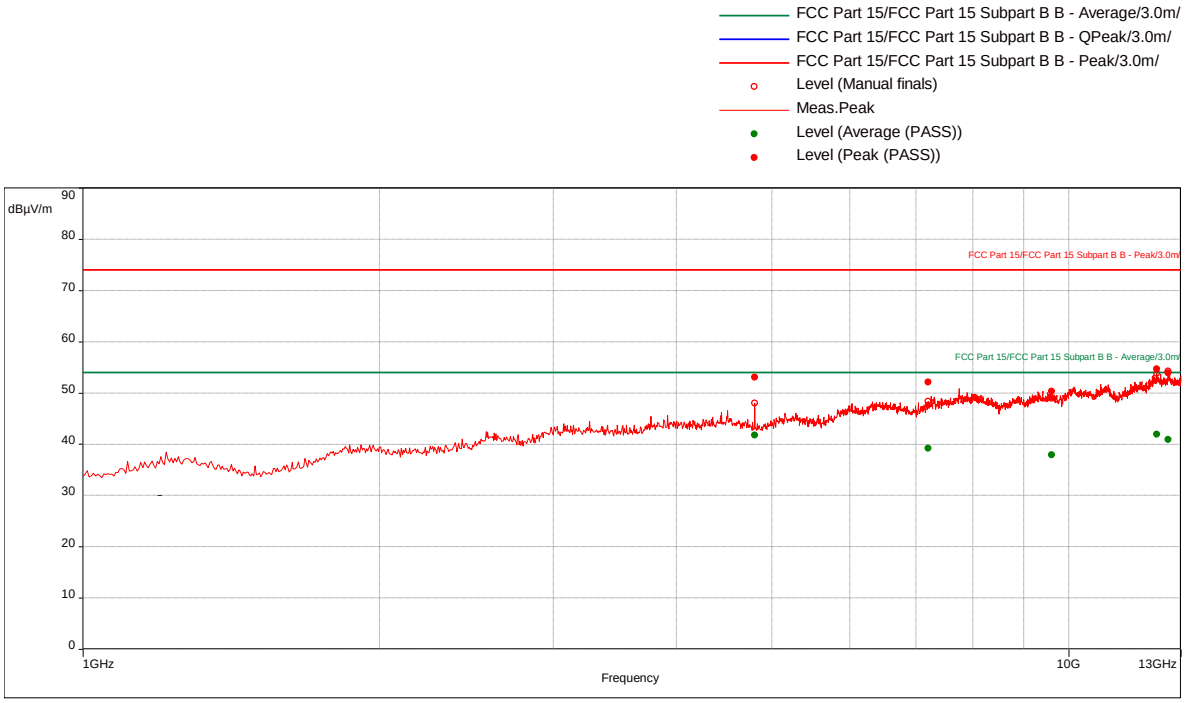
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

3-13 GHz, Battery Powered, Transmit @ Low Channel, EUT on Z-axis

Test Information:

Date and Time	2/21/2019 9:47:07 AM
Client and Project Number	Schneider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	1001mbar
Comments	BLE, Tx Low, Z-axis (Straight up), 3-13 GHz

Graph:



Results:

Peak (PASS) (5)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4803.684211	53.07	74.00	-20.93	297.00	3.79	Vertical	1000000.00	-11.60
7205.526316	52.10	74.00	-21.90	0.00	1.00	Vertical	1000000.00	-7.65
9612.368421	50.34	74.00	-23.66	253.00	1.70	Vertical	1000000.00	-4.71
12288.42105	54.72	74.00	-19.28	47.00	1.10	Horizontal	1000000.00	0.58
12620.26316	53.91	74.00	-20.09	239.00	1.00	Vertical	1000000.00	1.08

Average (PASS) (5)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4803.684211	41.76	54.00	-12.24	297.00	3.79	Vertical	1000000.00	-11.60
7205.526316	39.20	54.00	-14.80	0.00	1.00	Vertical	1000000.00	-7.65
9612.368421	37.86	54.00	-16.14	253.00	1.70	Vertical	1000000.00	-4.71
12288.42105	41.93	54.00	-12.07	47.00	1.10	Horizontal	1000000.00	0.58
12620.26316	40.87	54.00	-13.13	239.00	1.00	Vertical	1000000.00	1.08

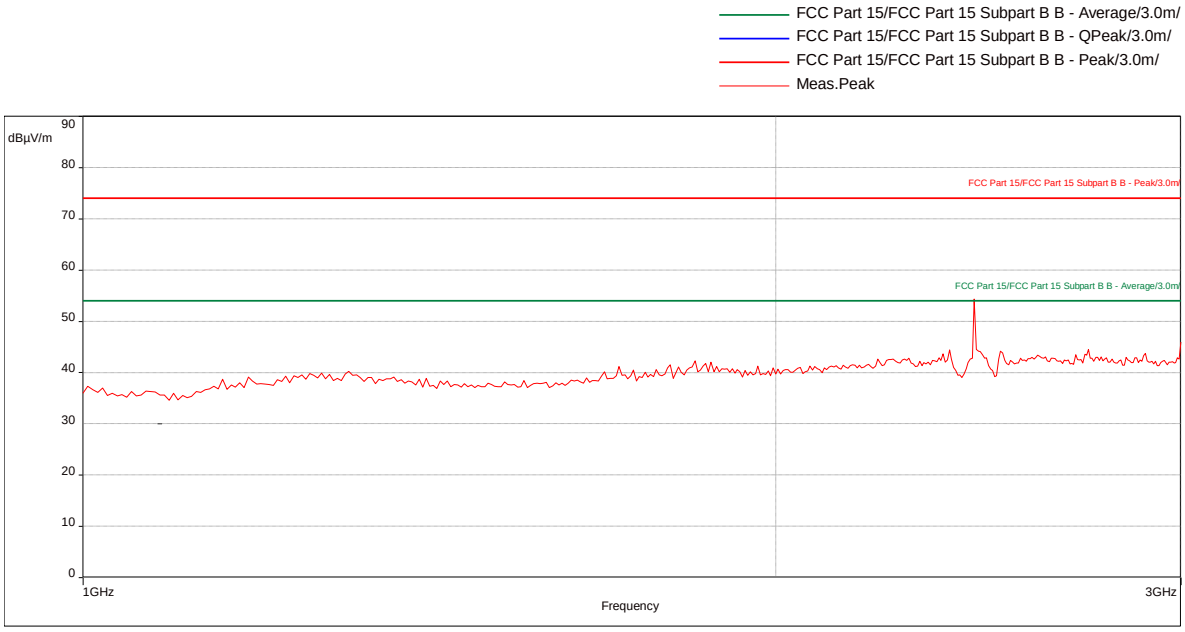
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

1-3 GHz, Battery Powered, Transmit @ Mid Channel, EUT on X-axis

Test Information:

Date and Time	2/24/2019 4:32:09 PM
Client and Project Number	Scheider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	984mbar
Comments	Tx Mid, EUT Side

Graph:



Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

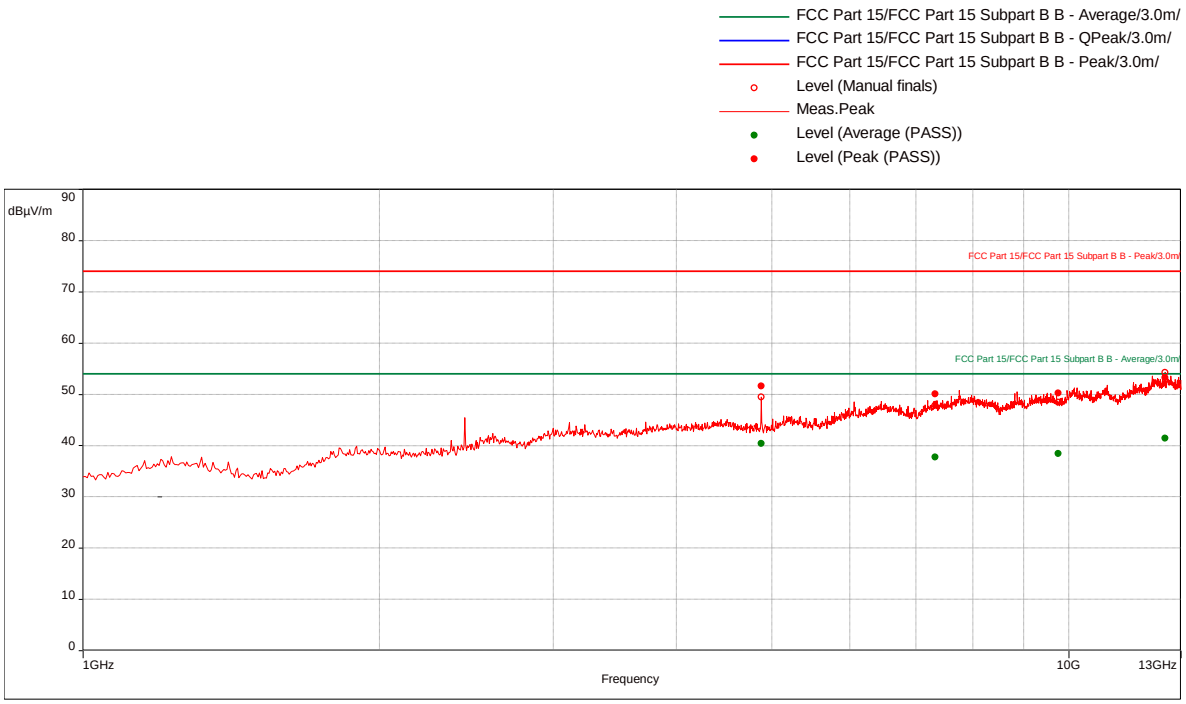
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

3-13 GHz, Battery Powered, Transmit @ Mid Channel, EUT on X-axis

Test Information:

Date and Time	2/21/2019 10:59:36 AM
Client and Project Number	Schneider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	1001mbar
Comments	BLE, Tx Mid, X-axis (Side), 3-13 GHz

Graph:



Results:

Peak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4879.736842	51.55	74.00	-22.45	313.00	1.00	Horizontal	1000000.00	-11.86
7320.789474	50.06	74.00	-23.94	266.00	1.35	Horizontal	1000000.00	-7.33
9758.157895	50.20	74.00	-23.80	54.00	2.20	Vertical	1000000.00	-4.59
12529.21053	53.24	74.00	-20.76	62.00	1.01	Horizontal	1000000.00	1.09

Average (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4879.736842	40.36	54.00	-13.64	313.00	1.00	Horizontal	1000000.00	-11.86
7320.789474	37.74	54.00	-16.26	266.00	1.35	Horizontal	1000000.00	-7.33
9758.157895	38.39	54.00	-15.61	54.00	2.20	Vertical	1000000.00	-4.59
12529.21053	41.41	54.00	-12.59	62.00	1.01	Horizontal	1000000.00	1.09

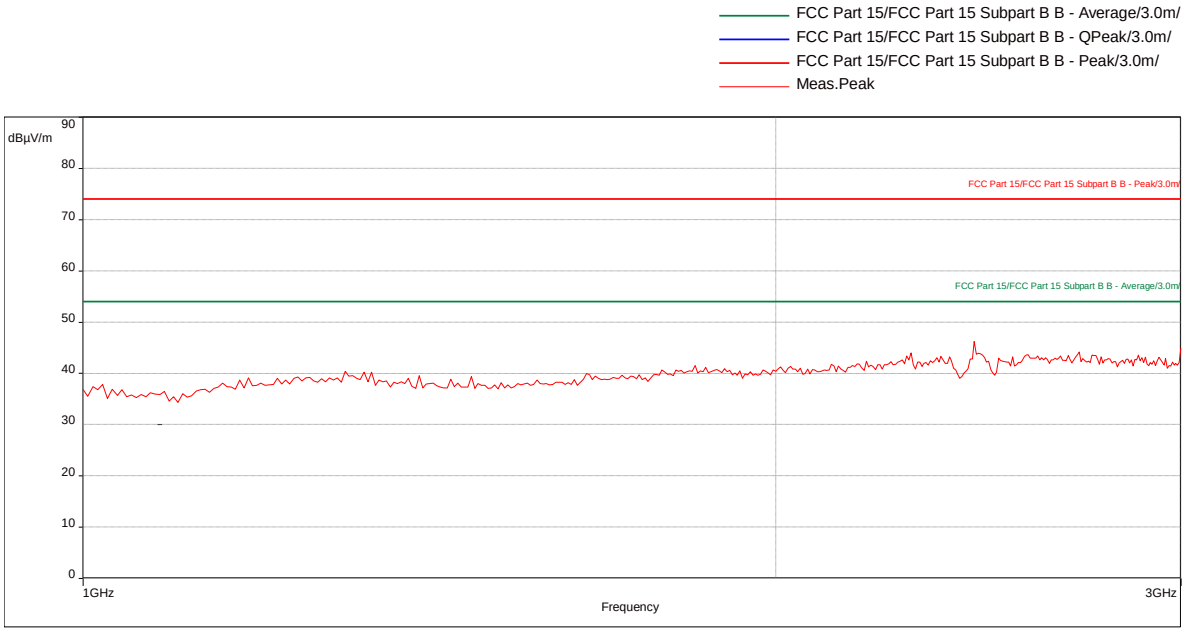
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

1-3 GHz, Battery Powered, Transmit @ Mid Channel, EUT on Y-axis

Test Information:

Date and Time	2/24/2019 4:38:42 PM
Client and Project Number	Scheider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	984mbar
Comments	Tx Mid, EUT Straight down

Graph:



Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

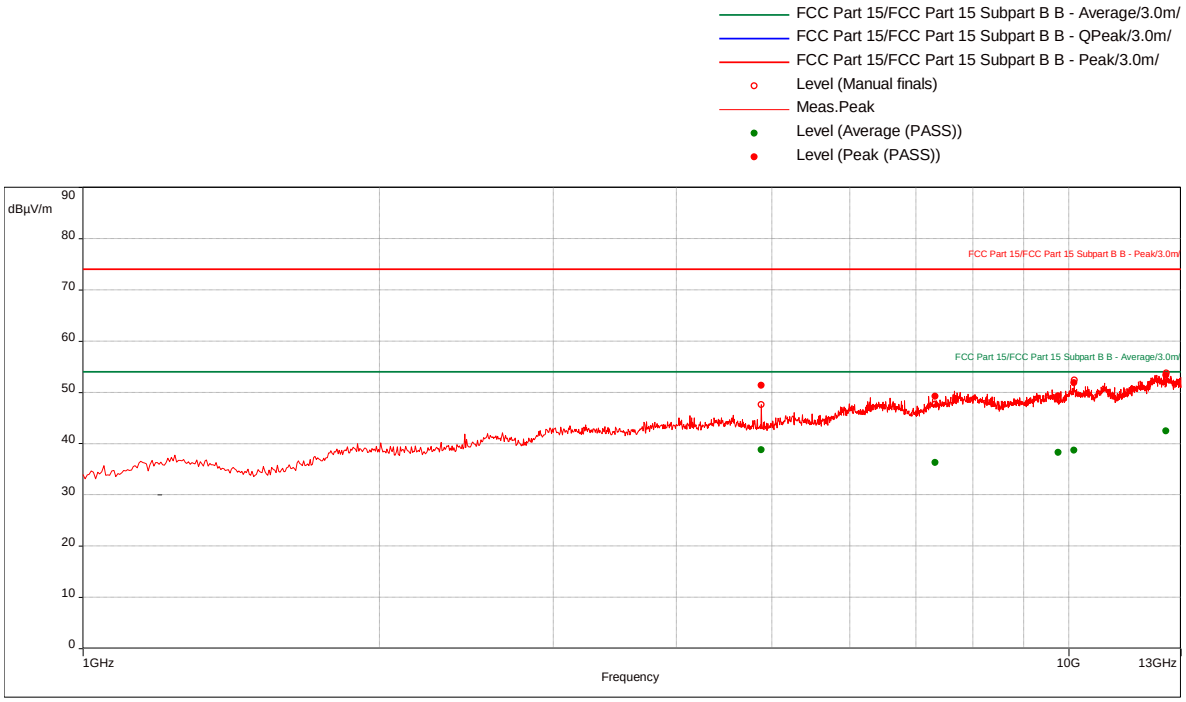
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

3-13 GHz, Battery Powered, Transmit @ Mid Channel, EUT on Y-axis

Test Information:

Date and Time	2/21/2019 11:27:00 AM
Client and Project Number	Schneider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	1001mbar
Comments	BLE, Tx Mid, Y-axis (Straight down), 3-13 GHz

Graph:



Results:

Peak (PASS) (5)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4880.526316	51.30	74.00	-22.70	91.00	3.74	Vertical	1000000.00	-11.86
7321.315789	49.18	74.00	-24.82	320.00	3.25	Horizontal	1000000.00	-7.33
9759.736842	49.28	74.00	-24.72	328.00	1.80	Vertical	1000000.00	-4.59
10132.36842	51.85	74.00	-22.15	298.00	2.60	Vertical	1000000.00	-3.47
12560.26316	53.27	74.00	-20.73	48.00	1.60	Horizontal	1000000.00	1.12

Average (PASS) (5)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4880.526316	38.75	54.00	-15.25	91.00	3.74	Vertical	1000000.00	-11.86
7321.315789	36.26	54.00	-17.74	320.00	3.25	Horizontal	1000000.00	-7.33
9759.736842	38.21	54.00	-15.79	328.00	1.80	Vertical	1000000.00	-4.59
10132.36842	38.72	54.00	-15.28	298.00	2.60	Vertical	1000000.00	-3.47
12560.26316	42.43	54.00	-11.57	48.00	1.60	Horizontal	1000000.00	1.12

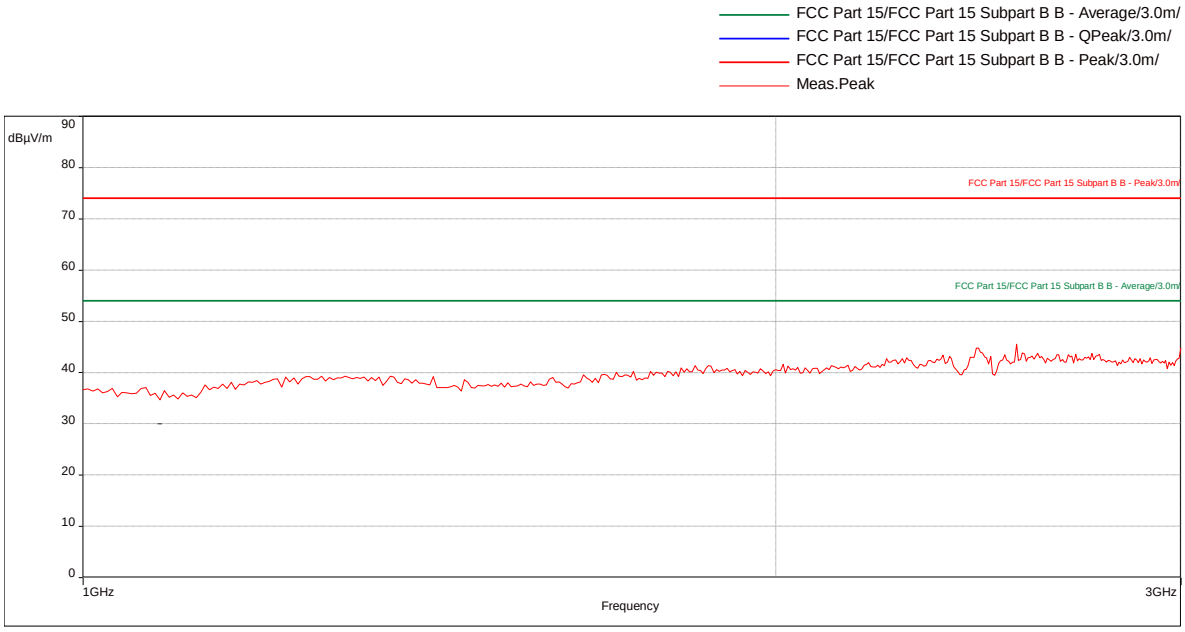
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

1-3 GHz, Battery Powered, Transmit @ Mid Channel, EUT on Z-axis

Test Information:

Date and Time	2/24/2019 4:21:47 PM
Client and Project Number	Scheider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	984mbar
Comments	Tx High, EUT Side

Graph:



Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

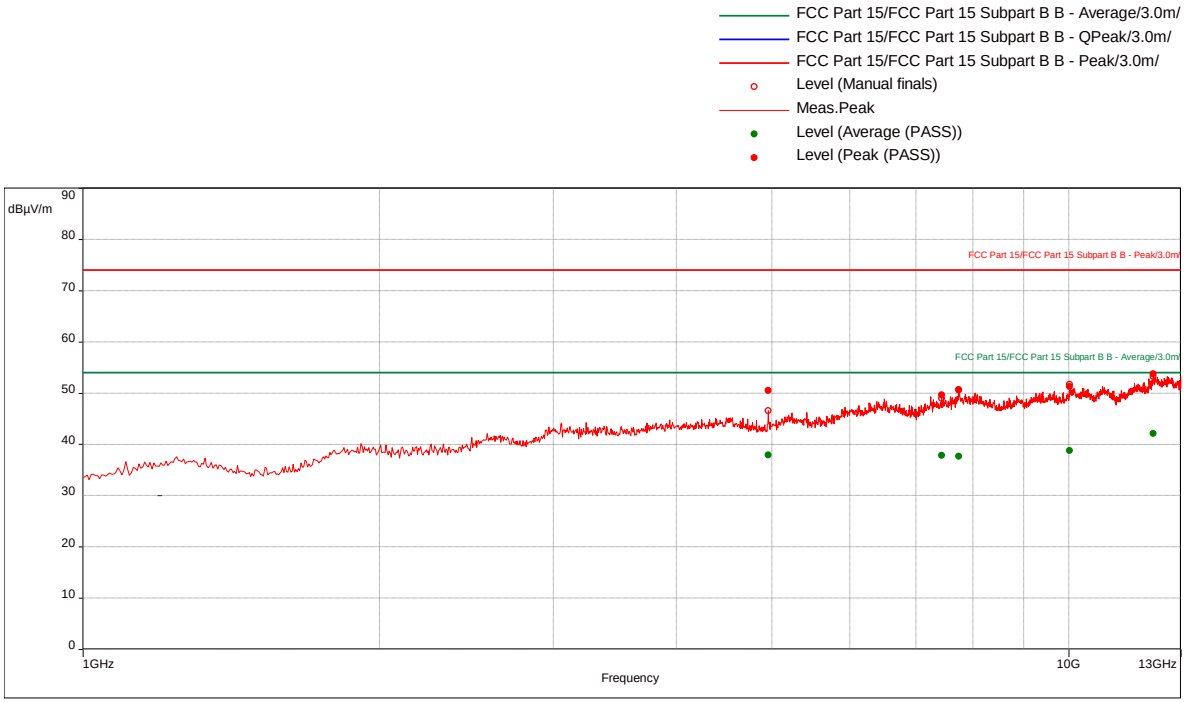
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

3-13 GHz, Battery Powered, Transmit @ Mid Channel, EUT on Z-axis

Test Information:

Date and Time	2/21/2019 12:31:46 PM
Client and Project Number	Schneider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	1001mbar
Comments	BLE, Tx High, Z-axis (Straight up), 3-13 GHz

Graph:



Results:

Peak (PASS) (5)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4960.526316	50.47	74.00	-23.53	107.00	3.84	Vertical	1000000.00	-11.80
7439.210526	49.60	74.00	-24.40	203.00	1.95	Vertical	1000000.00	-6.78
7740	50.63	74.00	-23.37	329.00	2.65	Horizontal	1000000.00	-5.23
10029.47368	51.29	74.00	-22.71	359.00	1.30	Horizontal	1000000.00	-3.76
12186.84211	53.74	74.00	-20.26	70.00	1.95	Horizontal	1000000.00	0.90

Average (PASS) (5)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4960.526316	37.92	54.00	-16.08	107.00	3.84	Vertical	1000000.00	-11.80
7439.210526	37.80	54.00	-16.20	203.00	1.95	Vertical	1000000.00	-6.78
7740	37.64	54.00	-16.36	329.00	2.65	Horizontal	1000000.00	-5.23
10029.47368	38.80	54.00	-15.20	359.00	1.30	Horizontal	1000000.00	-3.76
12186.84211	42.10	54.00	-11.90	70.00	1.95	Horizontal	1000000.00	0.90

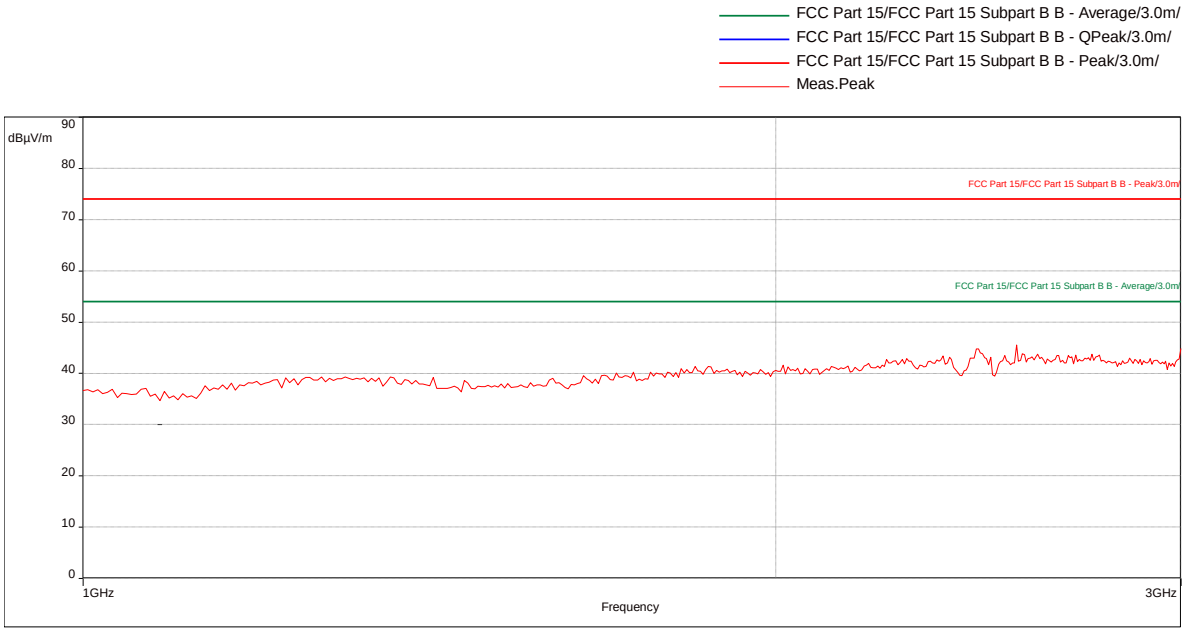
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

1-3 GHz, Battery Powered, Transmit @ High Channel, EUT on X-axis

Test Information:

Date and Time	2/24/2019 4:21:47 PM
Client and Project Number	Scheider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	984mbar
Comments	Tx High, EUT Side

Graph:



Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

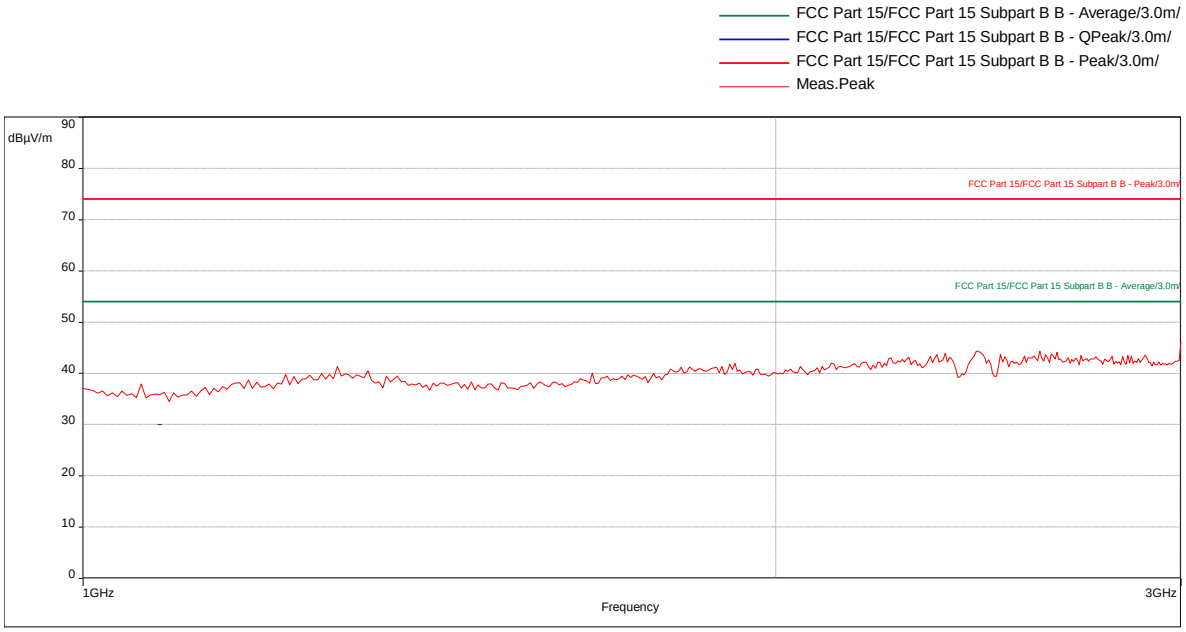
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

1-3 GHz, Battery Powered, Transmit @ High Channel, EUT on Y-axis

Test Information:

Date and Time	2/24/2019 4:16:57 PM
Client and Project Number	Scheider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	984mbar
Comments	Tx High, EUT Straight down

Graph:



Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

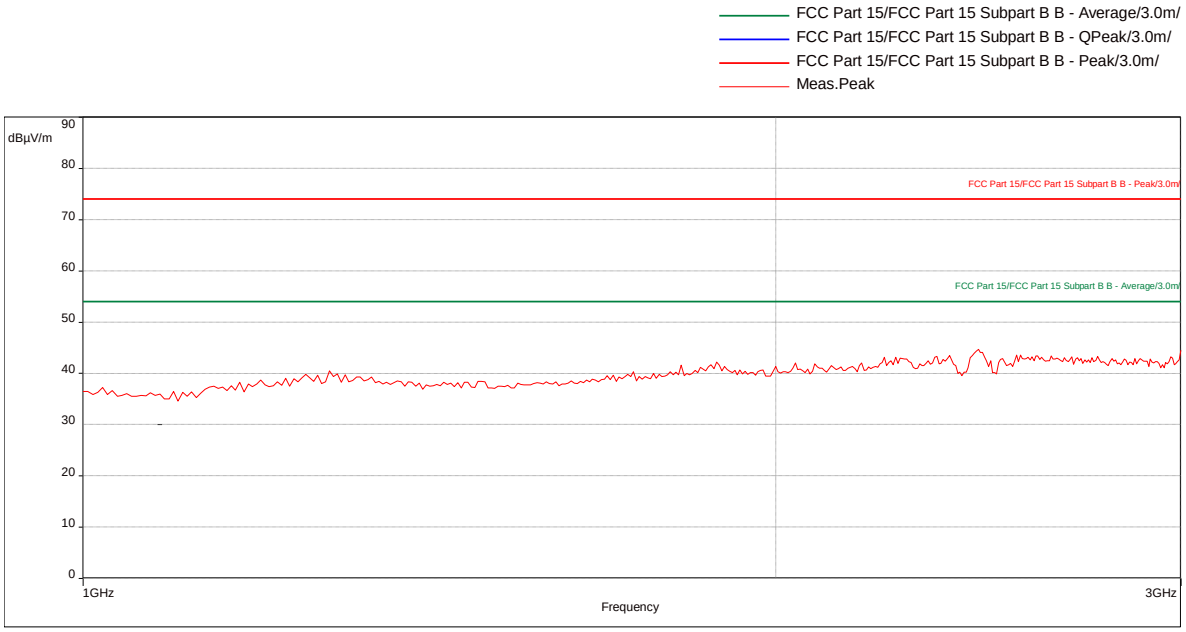
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

1-3 GHz, Battery Powered, Transmit @ High Channel, EUT on Z-axis

Test Information:

Date and Time	2/24/2019 4:14:14 PM
Client and Project Number	Scheider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	984mbar
Comments	Tx High, EUT Straight up

Graph:



Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
No emissions were detected.						Horizontal	1000000.00	
No emissions were detected.						Vertical	1000000.00	

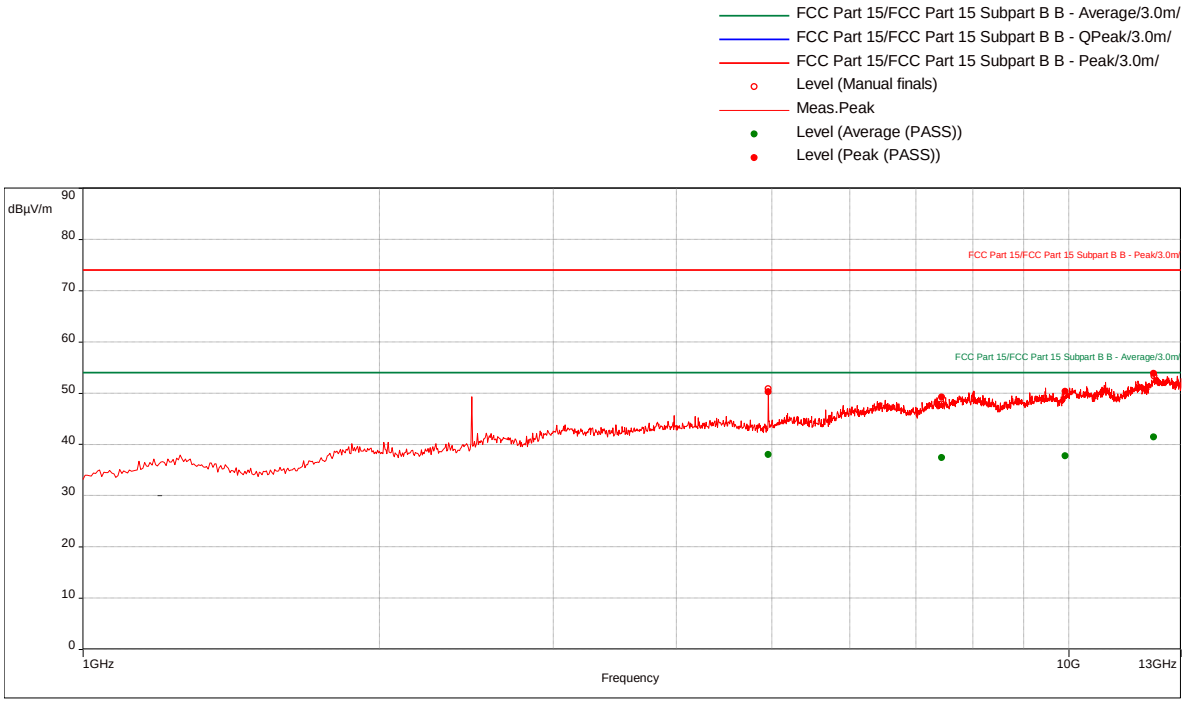
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

3-13 GHz, Battery Powered, Transmit @ High Channel, EUT on X-axis

Test Information:

Date and Time	2/21/2019 1:24:00 PM
Client and Project Number	Schneider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	1001mbar
Comments	BLE, Tx High, X-axis (Side), 3-13 GHz

Graph:



Results:

Peak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4960.526316	50.22	74.00	-23.78	344.00	1.05	Horizontal	1000000.00	-11.80
7435.526316	49.19	74.00	-24.81	254.00	3.64	Horizontal	1000000.00	-6.80
9920	50.28	74.00	-23.72	255.00	1.45	Horizontal	1000000.00	-4.51
12206.57895	53.82	74.00	-20.18	68.00	3.74	Vertical	1000000.00	0.99

Average (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4960.526316	38.02	54.00	-15.98	344.00	1.05	Horizontal	1000000.00	-11.80
7435.526316	37.35	54.00	-16.65	254.00	3.64	Horizontal	1000000.00	-6.80
9920	37.71	54.00	-16.29	255.00	1.45	Horizontal	1000000.00	-4.51
12206.57895	41.42	54.00	-12.58	68.00	3.74	Vertical	1000000.00	0.99

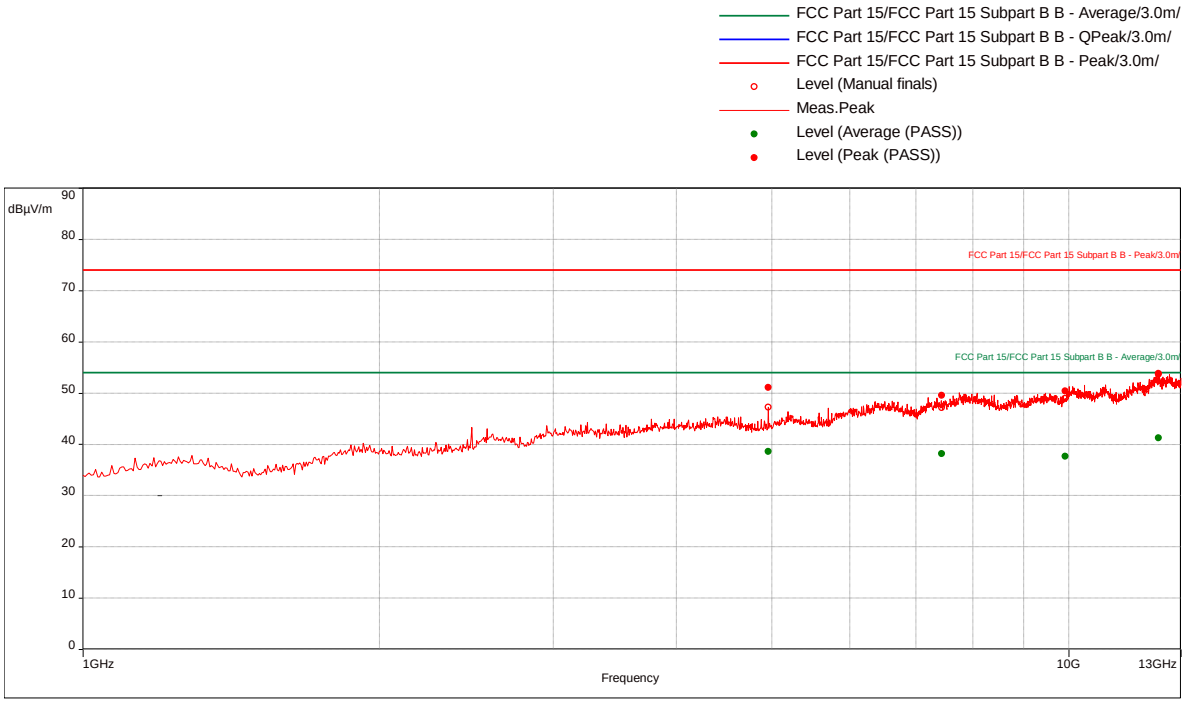
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

3-13 GHz, Battery Powered, Transmit @ High Channel, EUT on Y-axis

Test Information:

Date and Time	2/21/2019 12:59:04 PM
Client and Project Number	Schneider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	1001mbar
Comments	BLE, Tx High, Z-axis (Straight down), 3-13 GHz

Graph:



Results:

Peak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4960.526316	51.10	74.00	-22.90	269.00	3.84	Vertical	1000000.00	-11.80
7435.789474	49.58	74.00	-24.42	269.00	1.10	Vertical	1000000.00	-6.80
9918.157895	50.40	74.00	-23.60	77.00	2.55	Horizontal	1000000.00	-4.52
12345.26316	53.62	74.00	-20.38	91.00	3.25	Vertical	1000000.00	0.52

Average (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4960.526316	38.59	54.00	-15.41	269.00	3.84	Vertical	1000000.00	-11.80
7435.789474	38.20	54.00	-15.80	269.00	1.10	Vertical	1000000.00	-6.80
9918.157895	37.63	54.00	-16.37	77.00	2.55	Horizontal	1000000.00	-4.52
12345.26316	41.28	54.00	-12.72	91.00	3.25	Vertical	1000000.00	0.52

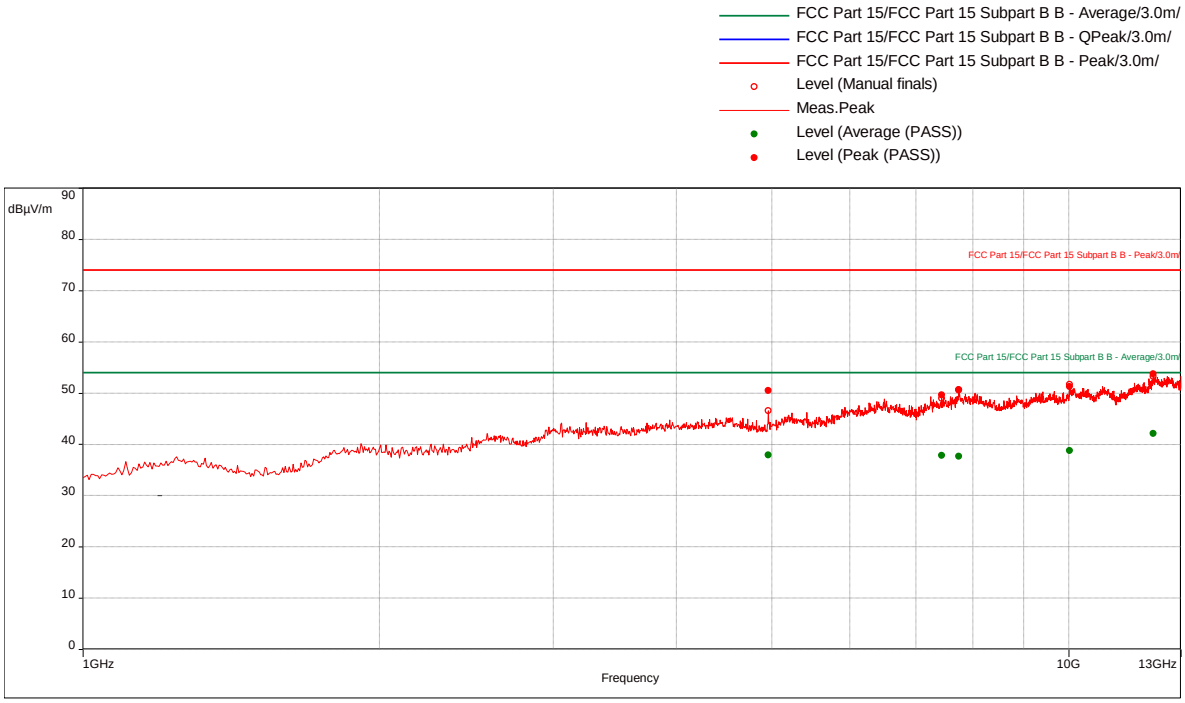
Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

3-13 GHz, Battery Powered, Transmit @ High Channel, EUT on Z-axis

Test Information:

Date and Time	2/21/2019 12:31:46 PM
Client and Project Number	Schneider
Engineer	Kouma Sinn
Temperature	21C
Humidity	22%
Atmospheric Pressure	1001mbar
Comments	BLE, Tx High, Y-axis (Straight up), 3-13 GHz

Graph:



Results:

Peak (PASS) (5)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4960.526316	50.47	74.00	-23.53	107.00	3.84	Vertical	1000000.00	-11.80
7439.210526	49.60	74.00	-24.40	203.00	1.95	Vertical	1000000.00	-6.78
7740	50.63	74.00	-23.37	329.00	2.65	Horizontal	1000000.00	-5.23
10029.47368	51.29	74.00	-22.71	359.00	1.30	Horizontal	1000000.00	-3.76
12186.84211	53.74	74.00	-20.26	70.00	1.95	Horizontal	1000000.00	0.90

Average (PASS) (5)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol. (V/H)	RBW (Hz)	Correction (dB)
4960.526316	37.92	54.00	-16.08	107.00	3.84	Vertical	1000000.00	-11.80
7439.210526	37.80	54.00	-16.20	203.00	1.95	Vertical	1000000.00	-6.78
7740	37.64	54.00	-16.36	329.00	2.65	Horizontal	1000000.00	-5.23
10029.47368	38.80	54.00	-15.20	359.00	1.30	Horizontal	1000000.00	-3.76
12186.84211	42.10	54.00	-11.90	70.00	1.95	Horizontal	1000000.00	0.90

Notes: The general limit FCC Part 15.209 was used for all emissions. This limit is identical to FCC Part 15 Subpart B Class B.

13-25 GHz on Low, Mid, and High Channels Radiated Emissions

Company:	Schneider Electric Systems USA Inc.			Antenna & Cables:	LF	Bands: N, LF, HF, SHF	
Model #:	IAN-CC			Antenna:	EMC04	ETS005	
Serial #:	3016097			Cable(s):	CBLSHF204 11-15-19.txt	145-130_9-13-2019.txt	
Engineers:	Vathana Ven	Location:	10m Chamber	Barometer:	BAR1	Filter:	REA005
Project #:	G103836530	Date(s):	02/14/19				
Standard:	FCC Part 15.247 & 15.209			Temp/Humidity/Pressure:	21C	22%	1005mbar
Receiver:	145128	Limit Distance (m):	3				
PreAmp:	PRE9 09-14-19.txt	Test Distance (m):	3				

PreAmp Used? (Y or N): Y Voltage/Frequency: Internal Battery Frequency Range: 18-25 GHz

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
Testing was performed manually at 10cm from the EUT. No emissions were detected at low, mid, and high channels on all axis											

Test Personnel:	Vathana Ven VSV	Test Date:	02/14/2019, 02/15/2019
	Kouma Sinn KPS		02/24/2019
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	CFR47 FCC Part 15.247 RSS-247	Limit Applied:	See report section 8.3
Input Voltage:	Internal Battery Powered		
Pretest Verification w/ Ambient Signals or BB Source:	BB Source	Ambient Temperature:	21, 21, 21 ºC
		Relative Humidity:	22, 22, 22 %
		Atmospheric Pressure:	1005 1005, 984 mbars

Deviations, Additions, or Exclusions: None

9 Digital Device and Receiver Radiated Spurious Emissions

9.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B, ICES 003, and ANSI C 63.4.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain 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.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

Alternately, when BAT-EMC Emission Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. The “Correction” includes Antenna Factor, Preamp, and Cable Loss. These are already accounted for in the “Level” column.

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
BAR1'	Digital 4 Line Barometer	Mannix	0ABA116	BAR1	04/30/2018	04/30/2019
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/22/2018	03/22/2019
145-410'	Cables 145-420 145-421 145-422 145-406	Huber + Suhner	10m Track A Cables	multiple	07/25/2018	07/25/2019
PRE11'	50dB gain pre-amp	Keith H	PRE11	PRE11	10/27/2018	10/27/2019
145145'	Broadband Hybrid Antenna 30 MHz - 3 GHz	Sunol Sciences Corp.	JB3	A122313	05/16/2018	05/16/2019
ETS005'	1-18GHz horn antenna	ETS-Lindgren	3117	00218279	05/14/2018	05/14/2019
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	06/14/2018	06/14/2019
REA008'	band reject filter 2.4GHz	Reactel, Inc	12RX7-2441.75-x140 S	17-01	07/13/2018	07/13/2019
145-416'	Cables 145-420 145-423 145-425 145-408	Huber + Suhner	3m Track B cables	multiple	07/25/2018	07/25/2019

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	3.17.0.3

9.3 Results:

The sample tested was found to Comply.

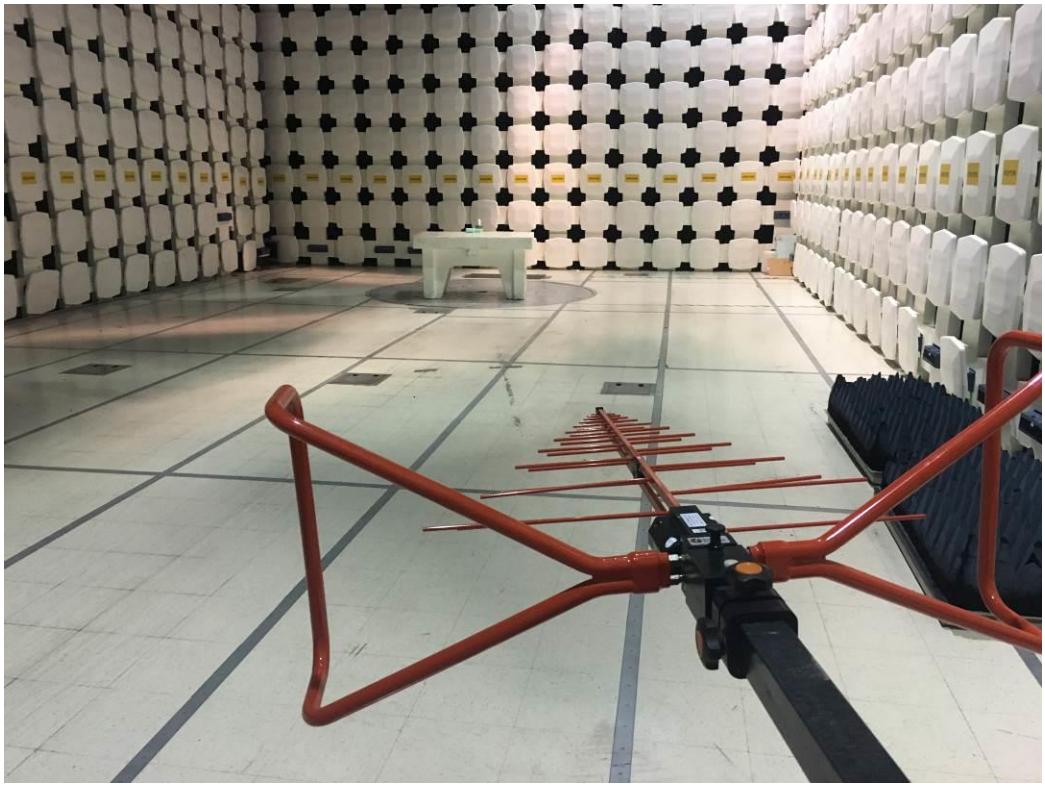
§15.109 Radiated emission limits.

The field strength of radiated emissions form unintentional radiators at a distance of 3 meters shall not exceed the following values.

Frequency of emission (MHz)	Field strength (microvolts/meter)	Field strength (dBµV/m)
30-88	100	40.00
88-216	150	43.52
216-960	200	46.02
Above 960	500	54.00

9.4 Setup Photographs:

Radiated Emissions Test Setup, 30-1000 MHz



Radiated Emissions Test Setup, 1-13 GHz

Photos Not Available

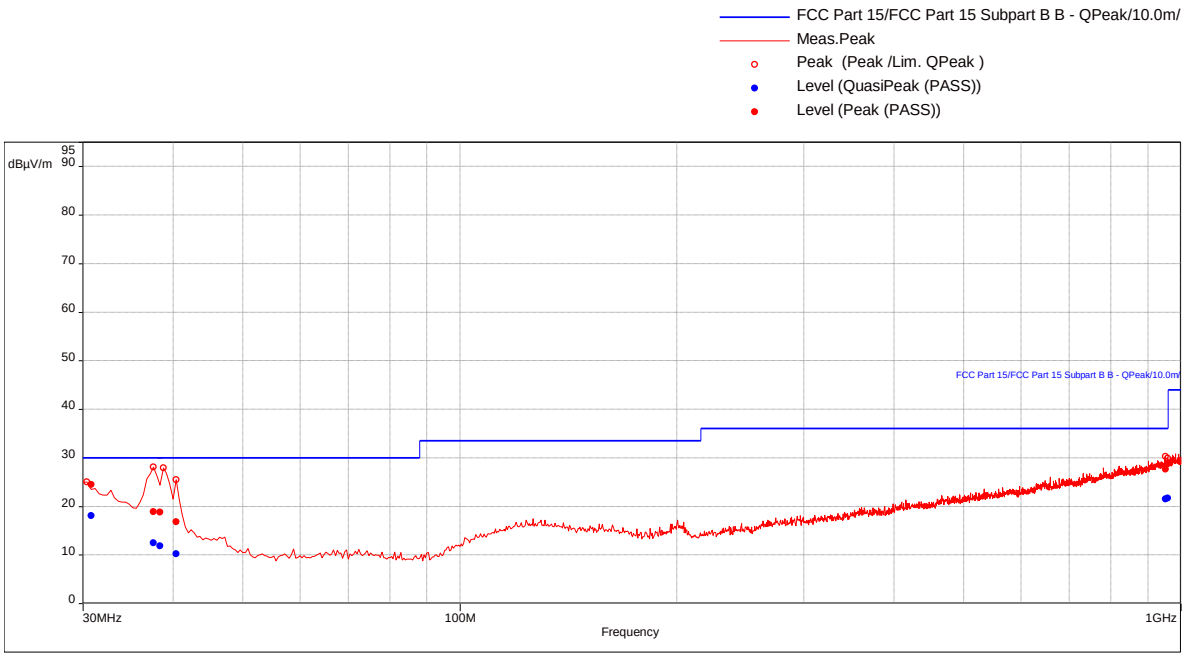
9.5 Plots/Data:

Radiated Emissions,30-1000 MHz

Test Information:

Date and Time	2/15/2019 5:45:58 PM
Client and Project Number	Schneider Electric_G103836530
Engineer	Vathana Ven
Temperature	21 deg C
Humidity	22%
Atmospheric Pressure	1005 mB
Comments	RE 30-1000MHz_Battery_Rx mode_Low channel

Graph:



Results:

QuasiPeak (PASS) (6)

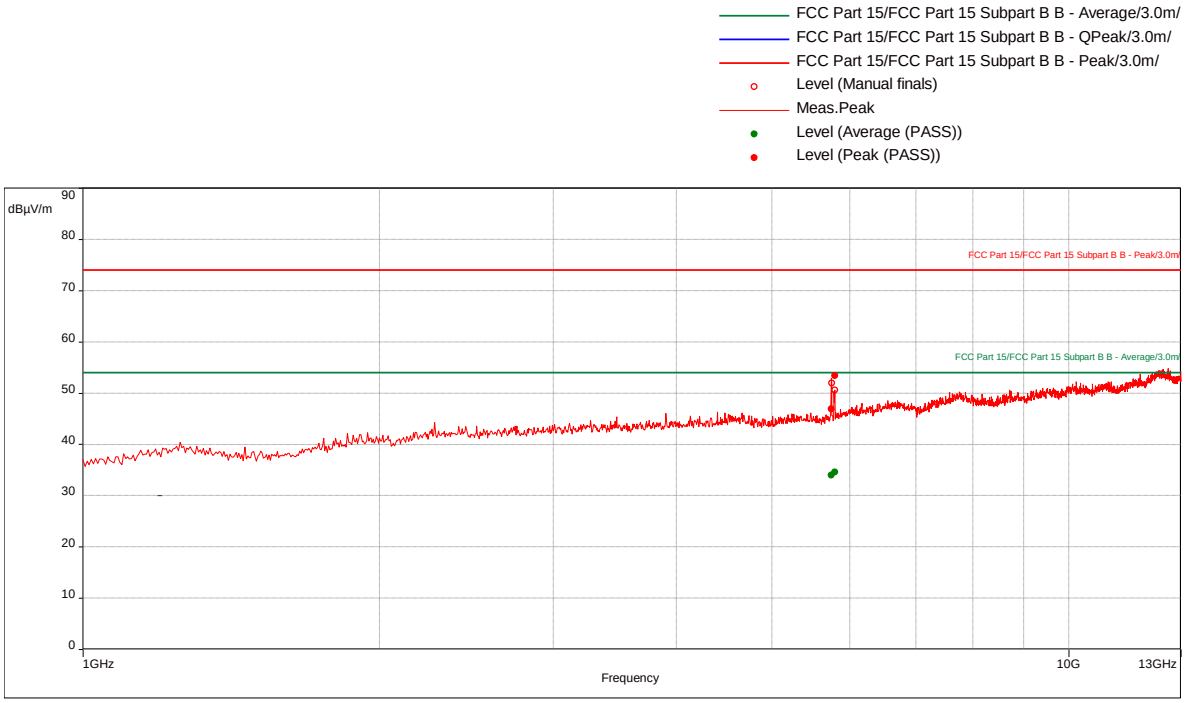
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
30.71578947	18.03	30.00	-11.97	105.00	1.45	Vertical	120000.00	-11.51
37.75789474	12.49	30.00	-17.51	62.00	1.76	Vertical	120000.00	-16.95
38.51578947	11.85	30.00	-18.15	62.00	2.03	Vertical	120000.00	-17.49
40.49473684	10.24	30.00	-19.76	41.00	3.98	Vertical	120000.00	-19.00
952.6421053	21.48	36.00	-14.52	70.00	1.51	Vertical	120000.00	-4.54
959.6315789	21.71	36.00	-14.29	61.00	3.56	Horizontal	120000.00	-4.38

Radiated Emissions,1-13 GHz

Test Information:

Date and Time	2/15/2019 9:35:57 PM
Client and Project Number	Schneider Electric_G103836530
Engineer	Vathana Ven
Temperature	21 deg C
Humidity	22%
Atmospheric Pressure	1005 mB
Comments	RE 1 to 13 GHz_Battery_Lo Channel_Rx mode

Graph:



Results:

Peak (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
5745.789474	46.91	74.00	-27.09	149.00	2.65	Vertical	1000000.00	8.08
5792.631579	53.41	74.00	-20.59	335.00	1.70	Vertical	1000000.00	8.25

Average (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
5745.789474	33.95	54.00	-20.05	149.00	2.65	Vertical	1000000.00	8.08
5792.631579	34.55	54.00	-19.45	335.00	1.70	Vertical	1000000.00	8.25

Test Personnel:	Vathana Ven VJV	Test Date:	02/15/2019
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 15 Subpart B, ICES-003	Limit Applied:	See report section 9.3
Input Voltage:	Internal Battery	Ambient Temperature:	21 ºC
Pretest Verification w/ Ambient Signals or BB Source:	BB Source	Relative Humidity:	22 %
		Atmospheric Pressure:	1005 mbars

Deviations, Additions, or Exclusions: None

10 Appendix – Antenna Specification

SPECIFICATION

Part No.	:	**WLP.2450.25.4.A.02**
Product Name	:	2450MHz Patch Antenna
Features	:	25mm*25mm*4.5mm ROHS Compliant
Photo	:	

1. Introduction

This WLP.25 patch antenna for ISM, Wi-Fi, Bluetooth and Zigbee is based on smart *XtremeGain*™ technology. It is mounted via pin and double-sided adhesive and has been selected as optimal solution for the 50*50mm ground plane. This passive patch offers typical gain response from 2.5 dBi and a higher gain can be achieved, depending on the Ground Plane, the space available and clearance afforded. The WLP.25's high gain performance is a perfect solution for metering and remote monitoring applications; it can deliver longer range than smaller chip antennas.

2. Key Antenna Performance Indicators

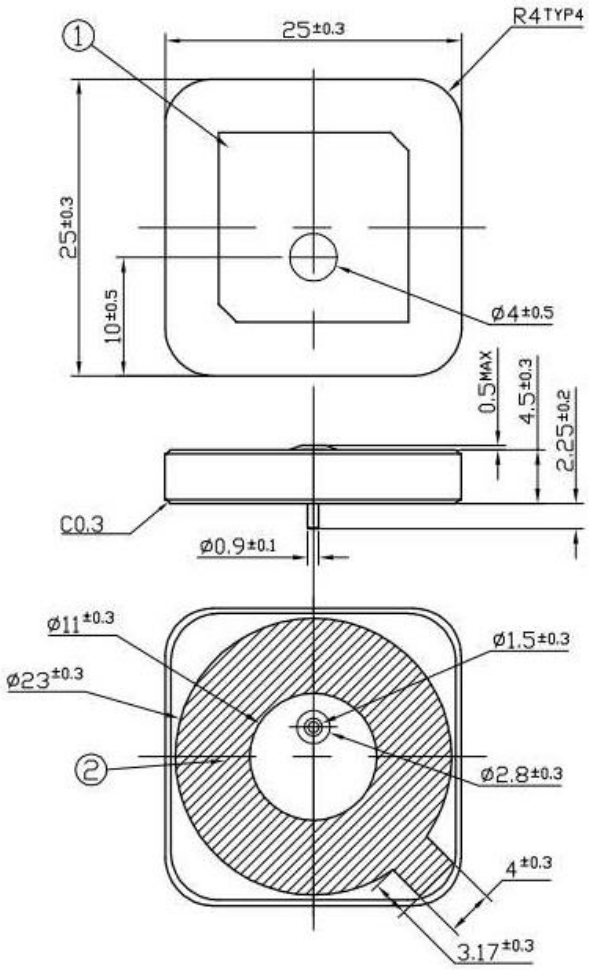
Original Patch Specification tested on 50*50mm ground plane

No	Parameter	Specification	Notes
1	Center Frequency	2482MHz	with 50*50mm GND Plane
2	Bandwidth	85 MHz min	Return Loss ≤-10dB
3	VSWR	2.0 max	Center Frequency
4	Gain at Zenith	+5.0dBic typ.	Center Frequency
5	Gain at 10° Elevation	-1.0dBic typ.	Center Frequency
6	Axial Ratio	3 dB Max	Center Frequency
7	Polarization	RHCP	
8	Impedance	50Ω	
9	Frequency Temp Coefficient (Tf)	0±20ppm/°C	-40°C to +105°C
10	Operating Temperature	-40°C to +105°C	

***Changes in user groundplane and environment will have an effect on the antennas performance**

3. Mechanical Specifications

3.1 Dimensions and Drawing



	Name	Material	Finish	QTY
1	WLP.2450 Patch 25x25x4	Ceramic	Clear	1
2	Double Sided Adhesive	NITTO 5015	White Liner	1

NOTE:
1.Double Sided Adhesive

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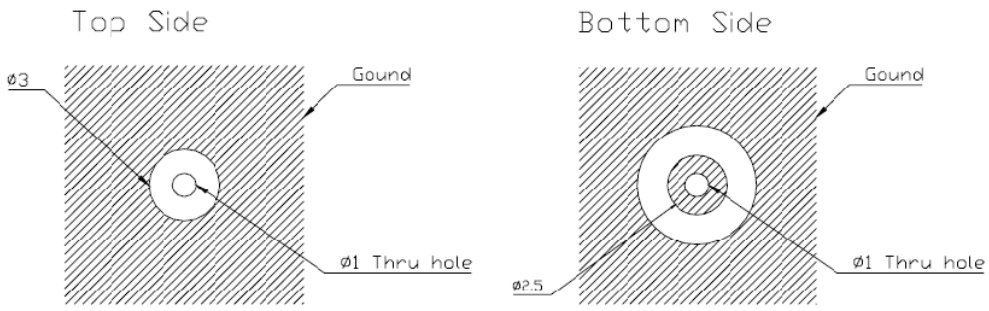
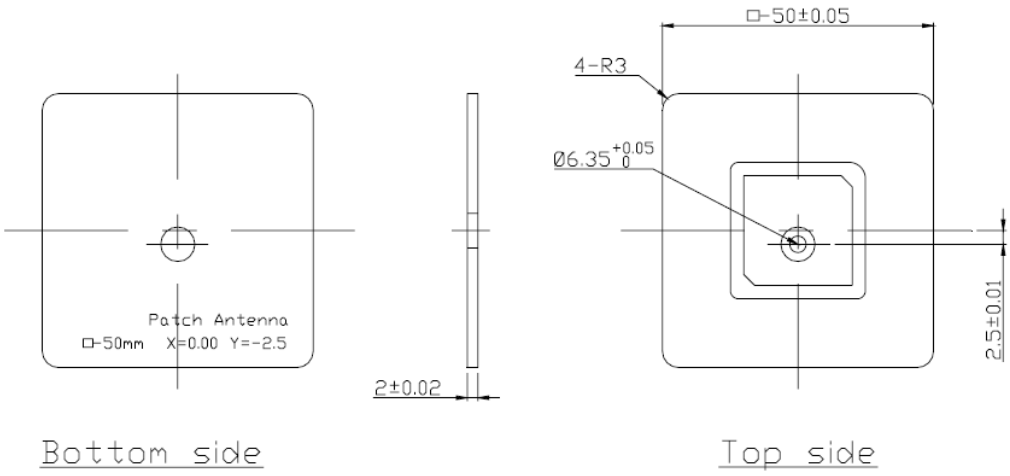
3.2 Layout Dimensions

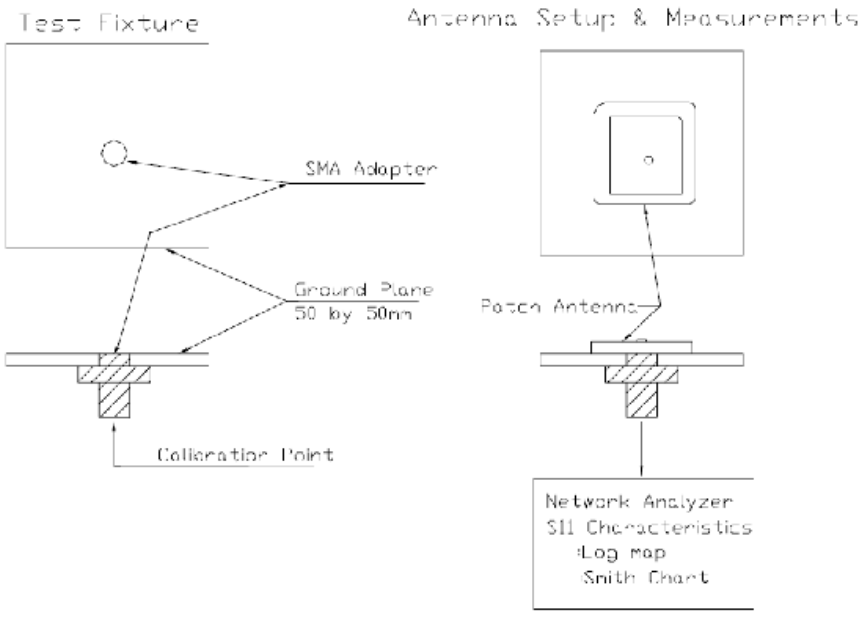


TOL:±0.20
UNIT:mm

3.3Ground Plane Dimension

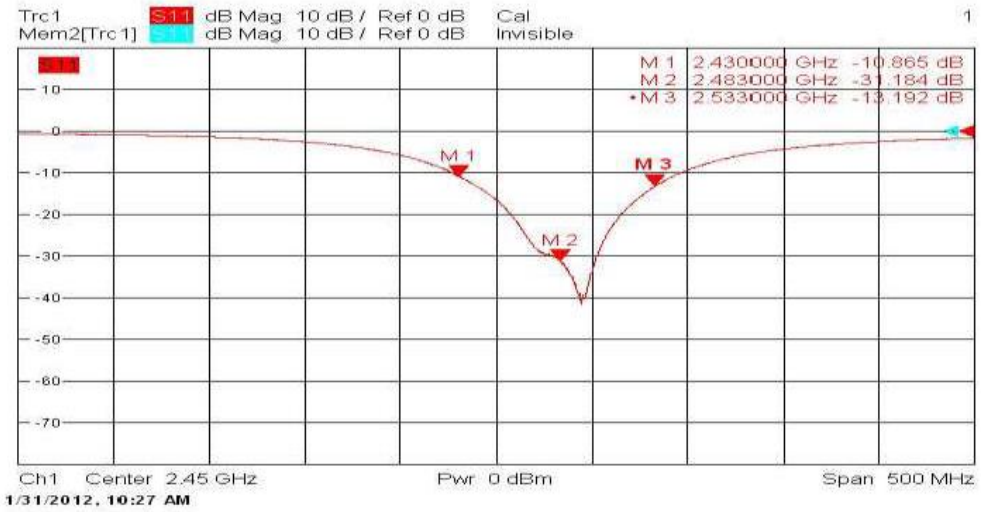


3.4 Test Fixture Antenna & Performance Measurements

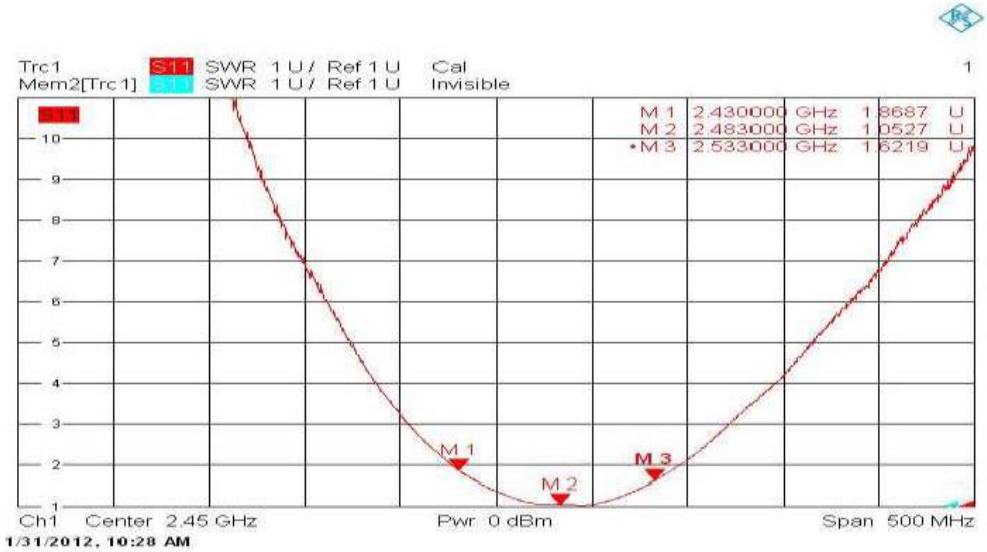


4. Performance Measurement

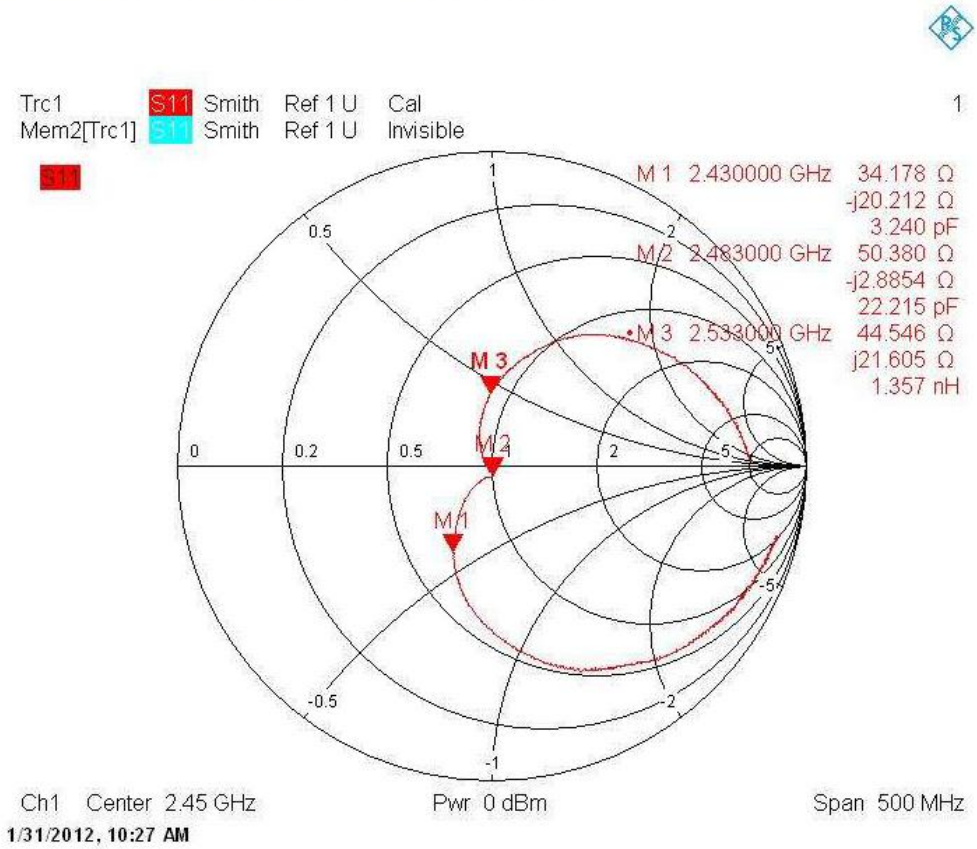
4.1 Antenna S11(Return Loss)



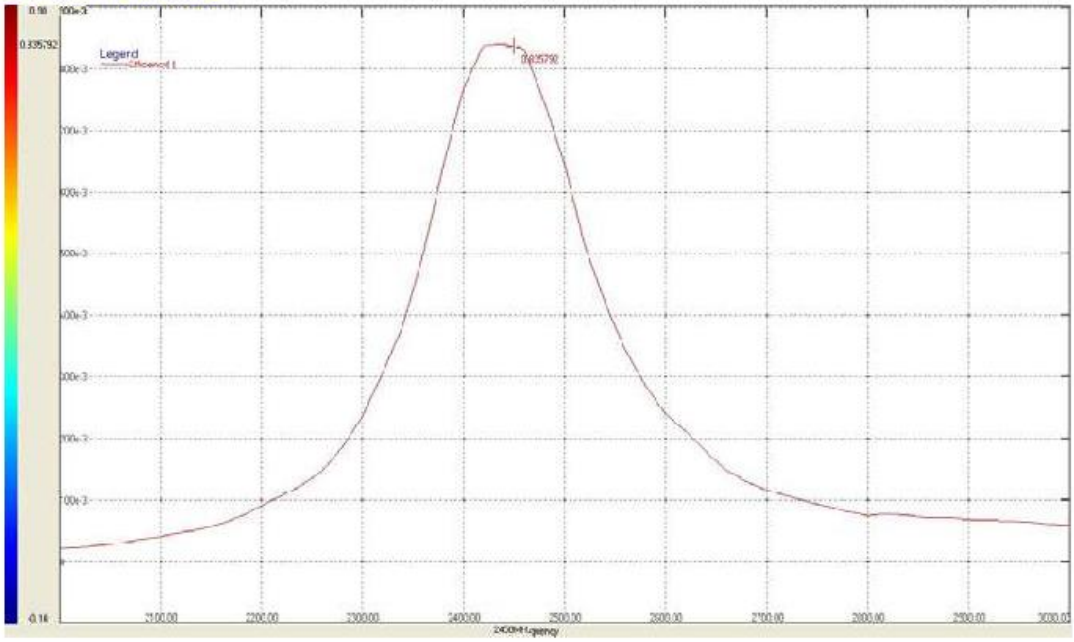
4.2 VSWR



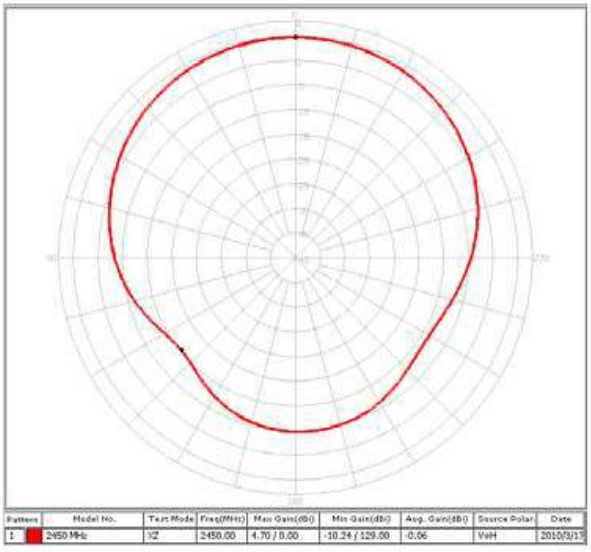
4.3 Antenna Smith Chart (Impedance)



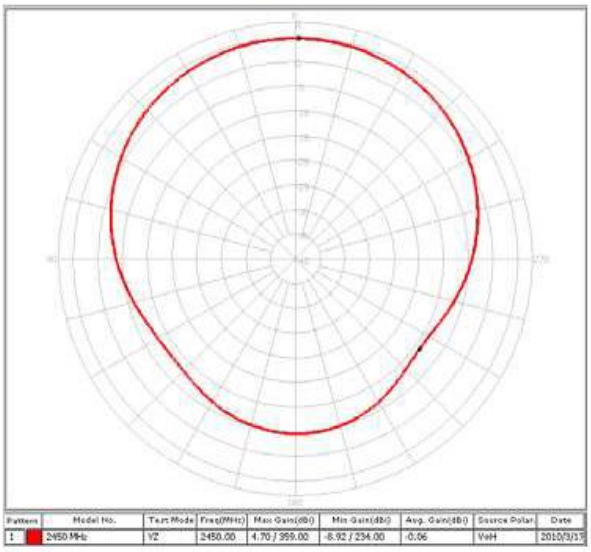
4.4 Efficiency



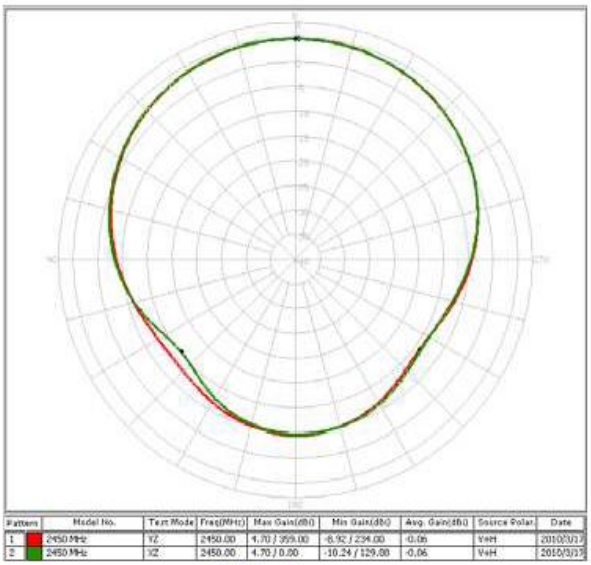
4.5 Antenna Gain



XZ-Plane



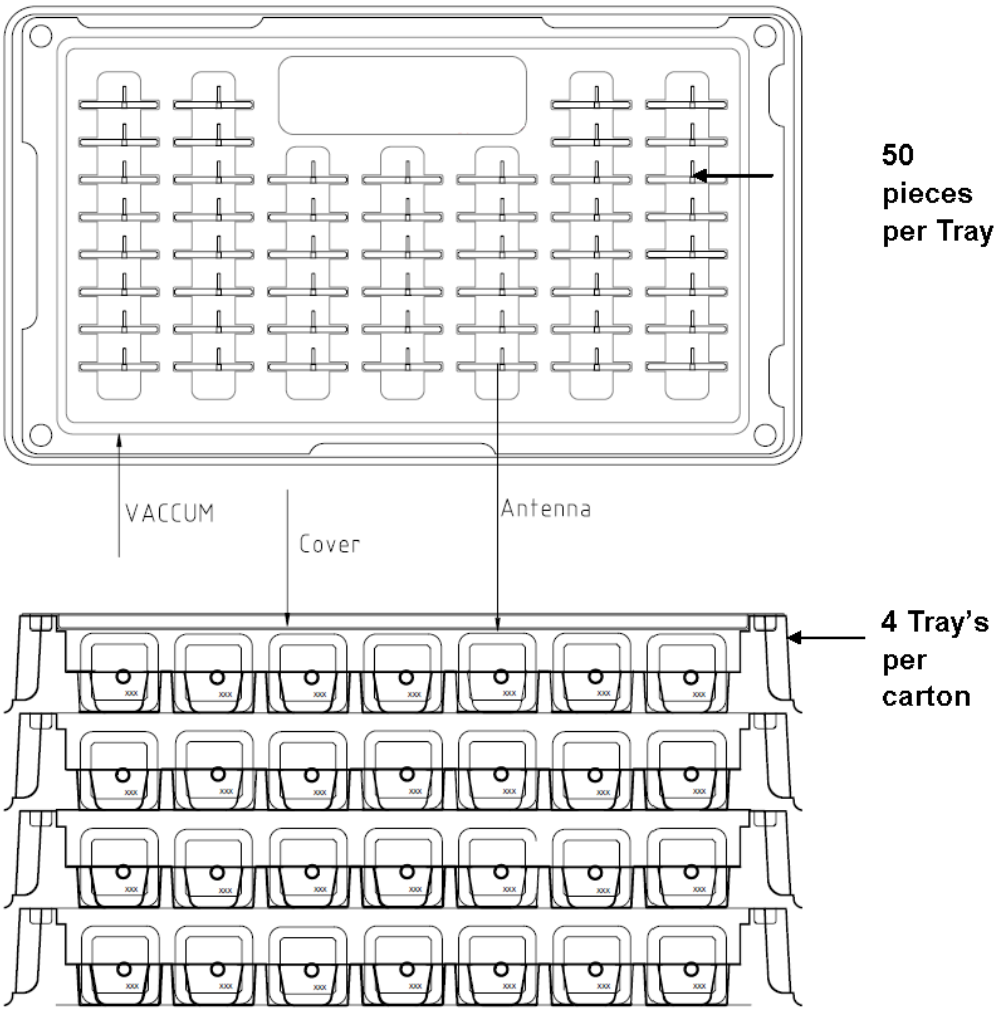
YZ-Plane

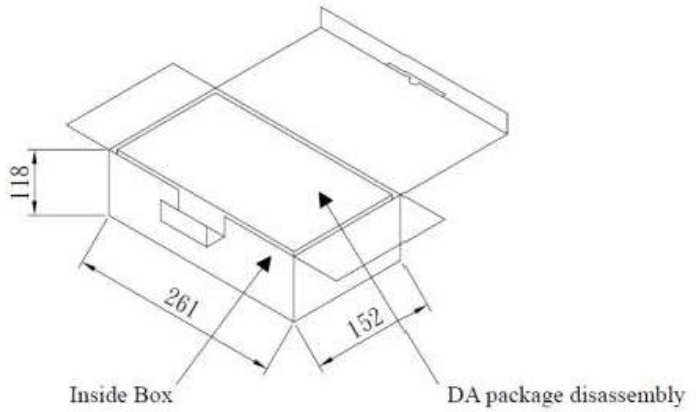

Pattern
Model No.
Test Mode
Freq(MHz)
Max Gain(dBi)
Min Gain(dBi)
Avg. Gain(dBi)
Source Polar
Date
1
2450 MHz
XZ
2450.00
4.70 / 359.00
-6.92 / 234.00
-0.06
V+H
2
2450 MHz
XZ
2450.00
4.70 / 0.00
-10.24 / 129.00
-0.06
V+H

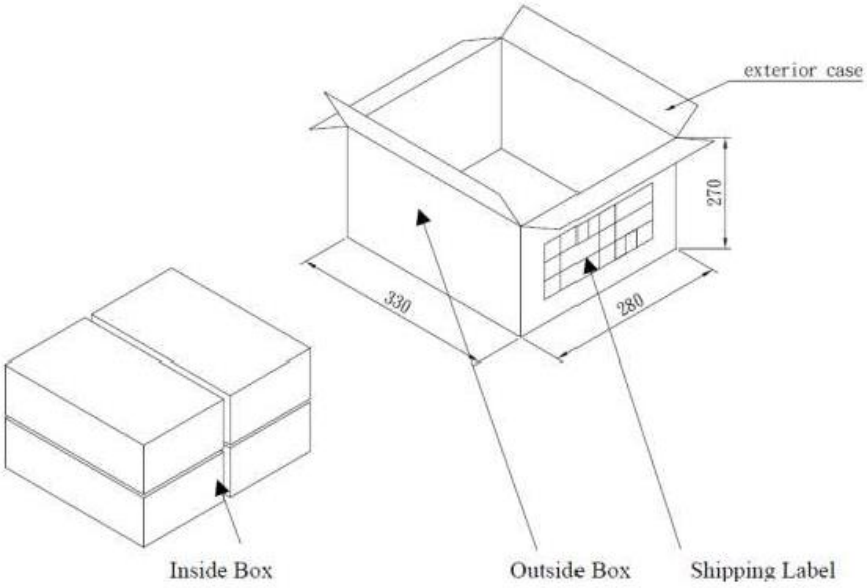
XY Plane

5. Packaging

- Per Tray: 50 pieces
- Per Carton(Inside Box) – 4 Trays = 200 pieces
- Outer Carton (Outside Box)– 4 Cartons = 800 pieces




118
261
152
Inside Box
DA package disassembly


exterior case
270
330
280
Inside Box
Outside Box
Shipping Label

11 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	02/25/2019	103836530BOX-011	KPS	VFV	Original Issue
1	04/26/2019	103836530BOX-011	KPS	VFV	Corrected the FCC and Canada ID #
2	05/14/2019	103836530BOX-011	KPS	VFV	Removed extra output power data, power spectral density data, and conducted band edge spurious emissions data
3	05/22/2019	103836530BOX-011	KPS	VFV	Re-measured the upper band edge spurious emissions and conducted output power
4	05/28/2019	103836530BOX-011	KPS	KH	Removed conducted output power and conducted spurious emissions