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Testing of

Electromagnetic Emissions

per

USA:	**CFR Title 47, Part 15.247**	(Emissions)
USA:	**CFR Title 47, Part 2.1091;2.1093**	(Exposure)
Canada:	**IC RSS-247/GENe**	(Emissions)
Canada:	**ISED RSS-102**	(Exposure)

are herein reported for

Allegion, PLC
BR400

Test Report No.: 20170316-RPTALGN10042Ar0

Applicant/Provider:
Allegion, PLC
11819 North Pennsylvania Street, Carmel Indiana 46032 USA
Phone: +1 (317) 810-3362, Fax: +1 (317) 810-3193
Contact Person: Ryan Kincaid; ryan.kincaid@allegion.com

Data Recorded by: Dr. Joseph Brunett, EMC-002790-NE

Reviewed by: Dr. Joseph Brunett, EMC-002790-NE

Prepared by: Dr. Joseph Brunett, EMC-002790-NE

Date of Issue: March 16, 2017

Results of testing completed on (or before) March 16, 2017 are as follows.

Emissions: The transmitter intentional emissions **COMPLY** with the regulatory limit(s) by no less than 23.5 dB. Transmit chain spurious or harmonic emissions **COMPLY** by no less than 3.3 dB. AC Power Line conducted emissions **COMPLY** by at least 7.9 dB.

Revision History

Rev. No.	Date	Details	Revised By
r0	March 16, 2017	Initial Release.	J. Brunett

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1 Test Report Scope and Limitations

1.1 Laboratory Authorization

Test Facility description and attenuation characteristics are on file with the FCC Laboratory, Columbia, Maryland (FCC Reg. No: 688478) and with ISED Canada, Ottawa, ON (File Ref. No: IC8719A-1 and IC22227-1).

1.2 Report Retention

For equipment verified to comply with the regulations herein, the manufacturer is obliged to retain this report with the product records for the life of the product, and no less than ten years. A copy of this Report will remain on file with this laboratory until March 2027.

1.3 Subcontracted Testing

This report does not contain data produced under subcontract.

1.4 Limitation of Results

The test results contained in this report relate only to the item(s) tested. Any electrical or mechanical modification made to the test item subsequent to the test date shall invalidate the data presented in this report. Any electrical or mechanical modification made to the test item subsequent to this test date shall require reevaluation.

1.5 Copyright

1.6 Endorsements

This report shall not be used to claim product endorsement by any accrediting, regulatory, or governmental agency.

1.7 Test Location

The EUT was fully tested by **Willow Run (WR) Test Labs, Inc.**, 7117 Fieldcrest Dr., Brighton, Michigan 48116 USA. Table 1 lists all site(s) employed herein. Specific test sites utilized are also listed in the test results sections of this report.

Table 1: Test Site List.

Description	Location	Quality Num.
OATS (3 meter)	8501 Beck Rd. Bldg 2227, Belleville MI 48111	OATSA

1.8 Traceability and Equipment Used

Pertinent test equipment used for measurements at this facility is listed in Table 2. The quality system employed at Willow Run (WR) Test Labs, Inc. has been established to ensure all equipment has a clearly identifiable classification, calibration expiry date, and that all calibrations are traceable to the SI through NIST, other recognized national laboratories, accepted fundamental or natural physical constants, ratio type of calibration, or by comparison to consensus standards.

Table 2: Equipment List.

Description	Manufacturer/Model	SN	Quality Num.	Last Cal By / Date Due
Spectrum Analyzer	Rhode-Schwarz / FSV30	101660	RSFSV30001	RS / May-2018
Biconical	EMCO / 93110B	9802-3039	BICEMCO01	Lib. Labs / Aug-2017
Log Periodic Antenna	EMCO / 3146	9305-3614	LOGEMCO01	Lib. Labs/ April-2017
Quad Ridge Horn	ETS Lind. / 3164-04	00066988	HRNQR316401	Lib. Labs / April-2017
Quad Ridge Horn	Singer / A6100	C35200	HQR2TO18S01	Lib. Labs / April-2017
K-Band Horn	JEF / NRL Std.	001	HRNK01	WRTL / Jul-2017
LISN	JEF / LISN	1	LISNJEF001	WRTL / Jul-2017

2 Test Specifications and Procedures

2.1 Test Specification and General Procedures

The ultimate goal of Allegion, PLC is to demonstrate that the Equipment Under Test (EUT) complies with the Rules and/or Directives below. Detailed in this report are the results of testing the Allegion, PLC BR400 for compliance to:

Country/Region	**Rules or Directive**	**Referenced Section(s)**
United States	Code of Federal Regulations	CFR Title 47, Part 15.247
Canada	ISED Canada	IC RSS-247/GENe

It has been determined that the equipment under test is subject to the rules and directives above at the date of this testing. In conjunction with these rules and directives, the following specifications and procedures are followed herein to demonstrate compliance (in whole or in part) with these regulations.

ANSI C63.4:2014	"Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
ANSI C63.10:2013 (USA)	"American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices"
FCC-KDB 558074 v03r05-2016	"Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247"
FCC-KDB 913591 2007	"Measurement of radiated emissions at the edge of the band for a Part 15 RF Device"
CFR 47 2.1091/1093	"447498 D01 General RF Exposure Guidance v06: RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices"
ISED Canada	"The Measurement of Occupied Bandwidth"
ISED Canada RSS-102	"Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)"

3 Configuration and Identification of the Equipment Under Test

3.1 Description and Declarations

The EUT is a vehicular BLE transceiver. The EUT is approximately 8 x 8 x 4 cm in dimension, and is depicted in Figure 1. It is powered by 115 VAC mains power. This device is a BLE communication device for linking BLE enabled devices to a WLAN network. Table 3 outlines provider declared EUT specifications.

Figure 1: Photos of EUT.

Table 3: EUT Declarations.

General Declarations			
Equipment Type:	BLE Hub Transceiver	**Country of Origin:**	China
Nominal Supply:	115 VAC	**Oper. Temp Range:**	Not Declared
Frequency Range:	2402 – 2480 MHz	**Antenna Dimension:**	Not Declared
Antenna Type:	Integral	**Antenna Gain:**	Integral
Number of Channels:	40	**Channel Spacing:**	2 MHz
Alignment Range:	Not Declared	**Type of Modulation:**	GFSK
United States			
FCC ID Number:	XPB-BR400	**Classification:**	DTS
Canada			
IC Number:	8053B-BR400	**Classification:**	Spread Spectrum

3.1.1 EUT Configuration

The EUT is configured for testing as depicted in Figure 2.

3.1.2 Modes of Operation

The EUT is capable of communicating with its BLE radio as well as a pre-approved modular WiLAN radio included in the chassis.

3.1.3 Variants

There is only a single variant of the EUT, as tested.

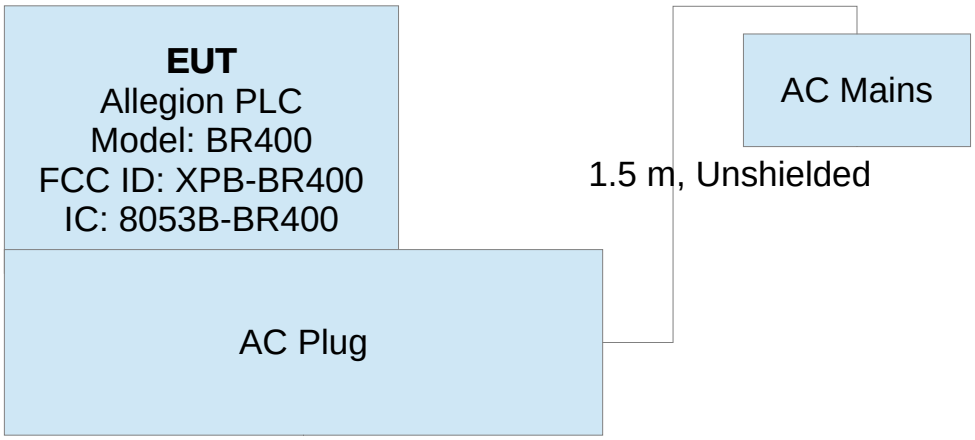


Figure 2: EUT Test Configuration Diagram.

3.1.4 Test Samples

Three samples in total were provided. A normal sample with UART interface cable attached and a like sample modified with an RF coaxial cable attached to the BLE radio output, both capable of direct programming via a test PC. A third unmodified sample was provided for photographs.

3.1.5 Functional Exerciser

Normal operating EUT functionality was verified by observation of transmitted signal.

3.1.6 Modifications Made

There were no modifications made to the EUT by this laboratory. The manufacturer updated the output filtering on the EUT after preliminary testing to bring the radio's harmonic emissions into compliance.

3.1.7 Production Intent

The EUT appears to be a production ready sample.

3.1.8 Declared Exemptions and Additional Product Notes

In addition to the BLE radio tested herein, the EUT employs a WLAN modular radio within this chassis. That WLAN radio is a pre-approved module (FCC ID: 2AFC3WIFI300SMT01, IC: 22503-WIFI300SMT01) and has been tested along with the radio in this report for intermodulation products and RF exposure to confirm module co-location requirements are met.

4 Emissions

4.1 General Test Procedures

4.1.1 Radiated Test Setup and Procedures

Radiated electromagnetic emissions from the EUT are first pre-scanned in our shielded anechoic chamber or GTEM test cell. Spectrum and modulation characteristics of all emissions are recorded. Instrumentation, including spectrum analyzers and other test equipment as detailed in Section 1.7 are employed. After pre-scan, emission measurements are made on the test site of record. If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in relevant test standards are followed. Alternatively, a layout closest to normal use (as declared by the provider) is employed if the resulting emissions appear to be worst-case in such a configuration. See Figure 3. All intentionally radiating elements that are not fixed-mounted in use are placed on the test table lying flat, on their side, and on their end (3-axes) and the resulting worst case emissions are recorded. If the EUT is fixed-mounted in use, measurements are made with the device oriented in the manner consistent with installation and then emissions are recorded.

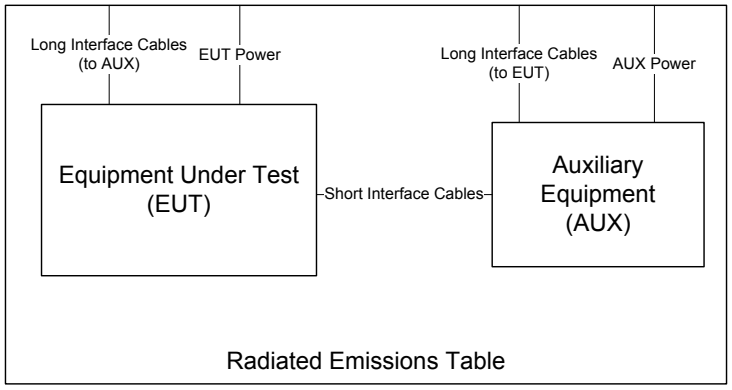


Figure 3: Radiated Emissions Diagram of the EUT.

If the EUT exhibits spurious emissions due to internal receiver circuitry, such emissions are measured with an appropriate carrier signal applied. For devices with intentional emissions below 30 MHz, a shielded loop antenna is used. It is placed at a 1 meter receive height. Emissions between 30 MHz and 1 GHz are measured using tuned dipoles and/or calibrated broadband antennas. For both horizontal and vertical polarizations, the test antenna is raised and lowered from 1 to 4 m in height until a maximum emission level is detected. The EUT is then rotated through 360^o in azimuth until the highest emission is detected. The test antenna is then raised and lowered one last time from 1 to 4 m and the worst case value is recorded. Emissions above 1 GHz are characterized using standard gain horn or broadband ridge-horn antennas on our OATS with a 4×5 m rectangle of H-4 absorber placed over the ground screen covering the OATS ground screen. Care is taken to ensure that test receiver resolution and video bandwidths meet the regulatory requirements, and that the emission bandwidth of the EUT is not reduced. Photographs of the test setup employed are depicted in Figure 4.

Where regulations allow for direct measurement of field strength, power values (dBm) measured on the test receiver / analyzer are converted to dBμV/m at the regulatory distance, using

$$E_{dist} = 107 + P_R + K_A - K_G + K_E - C_F$$

where P_R is the power recorded on spectrum analyzer, in dBm, K_A is the test antenna factor in dB/m, K_G is the combined pre-amplifier gain and cable loss in dB, K_E is duty correction factor (when applicable) in dB, and C_F is a distance conversion (employed only if limits are specified at alternate distance) in dB. This field strength value is then compared with the regulatory limit. If effective isotropic radiated power (EIRP) is computed, it is computed as

$$EIRP(dBm) = E_{3m}(dB\mu V/m) - 95.2.$$

When presenting data at each frequency, the highest measured emission under all possible EUT orientations (3-axes) is reported.

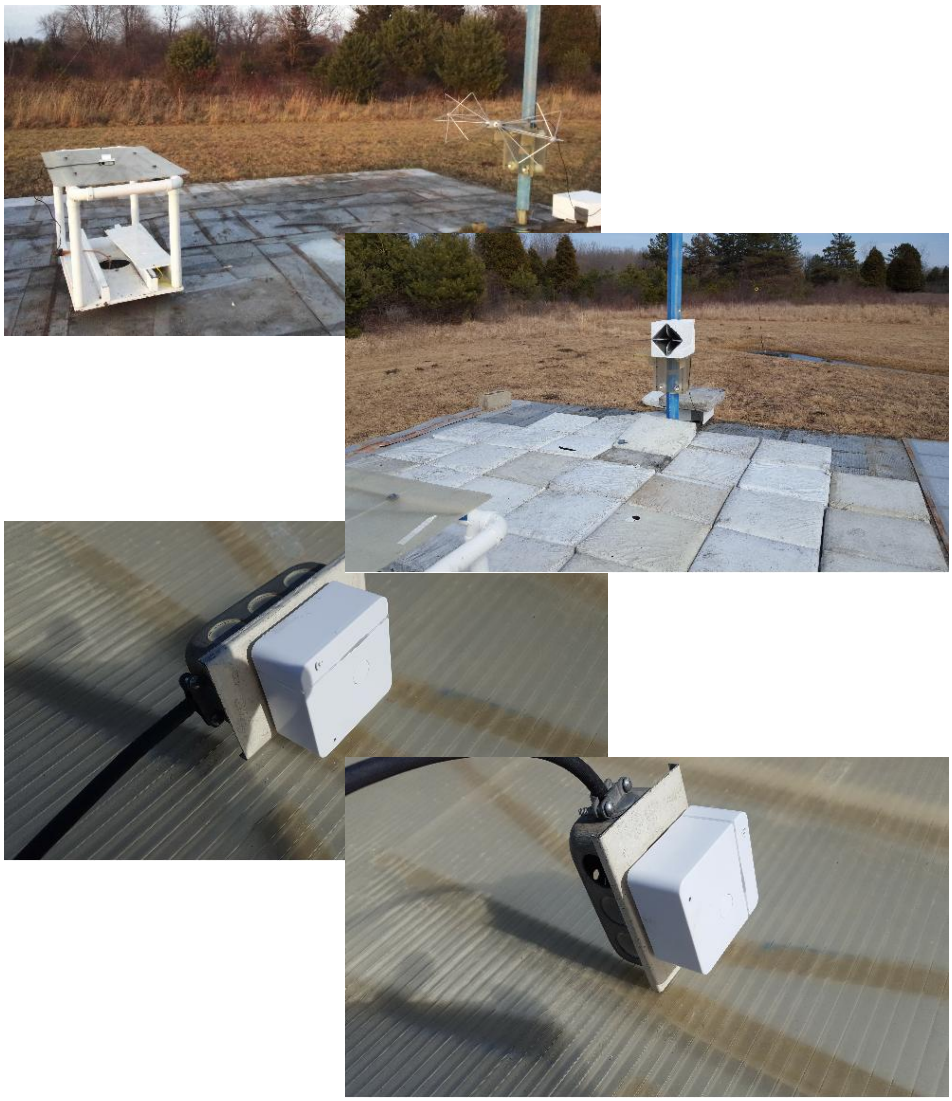


Figure 4: Radiated Emissions Test Setup Photograph(s).

4.1.2 Conducted Emissions Test Setup and Procedures

Transmit Antenna Port Conducted Emissions At least one sample EUT supplied for testing was provided with a 50Ω antenna port. Conducted transmit chain emissions measurements (where applicable) are made by connecting the EUT antenna port directly to the test receiver port. Photographs of the test setup employed are depicted in Figure 5.

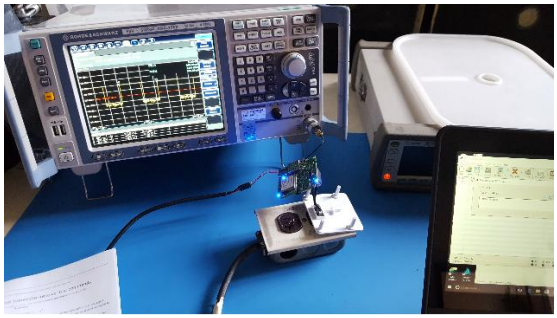


Figure 5: Conducted RF Test Setup Photograph(s).

AC Port Conducted Spurious For this device, AC power line conducted emissions are measured in our screen room. If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in ANSI C63.4 / CISPR 22 are employed. Alternatively, an on-table layout more representative of actual use may be employed if the resulting emissions appear to be worst-case in such a configuration. See Figure 6.

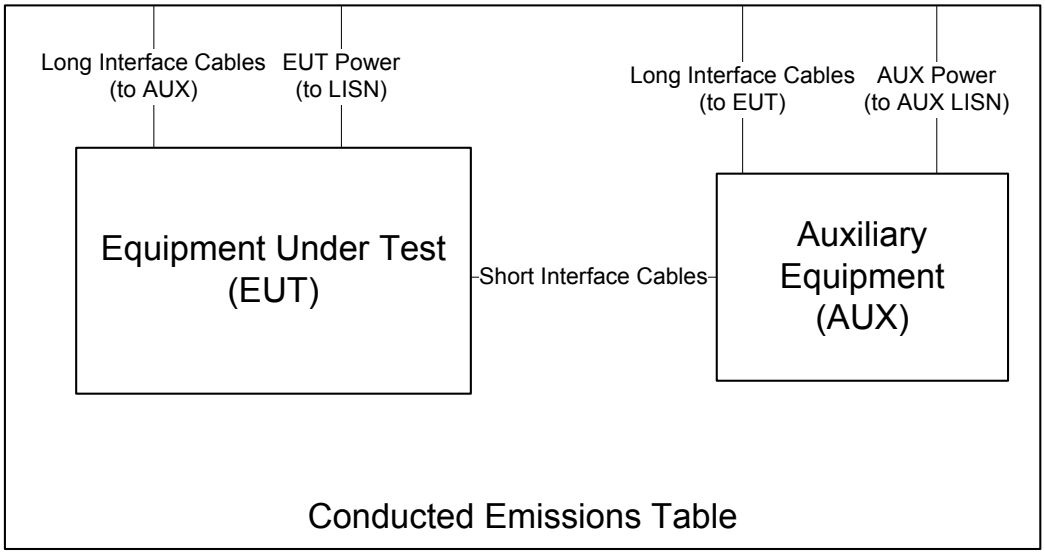


Figure 6: Conducted Emissions Setup Diagram of the EUT.

Conducted emissions are measured and recorded for each AC mains power source over the spectrum 0.15 MHz to 30 MHz for both the ungrounded (HI/PHASE) and grounded (LO/GND) conductors with the EUT placed in its highest current draw operating mode(s). The test receiver is set to peak-hold mode in order to record the peak emissions throughout the course of functional operation. Only if an emission exceeds or is near the limit are quasi-peak and average detection applied. Photographs of the test setup employed are depicted in Figure 7.

Figure 7: Conducted Emissions Test Setup Photograph(s).

4.1.3 Power Supply Variation

Tests at extreme supply voltages are made if required by the the procedures specified in the test standard, and results of this testing are detailed in this report.

In the case of this EUT, measurements of the worst-case radiated emissions are performed with the supply voltage varied by no less than 85% and 115% of the nominal rated value for devices connecting to AC power mains.

4.1.4 Thermal Variation

Tests at extreme temperatures are made if required by the procedures specified in the test standard, and results of this testing are detailed in this report. The provider has declared that the EUT is designed for operation over the temperature range Not Declared. Before any temperature measurements are made, the equipment is allowed to reach a thermal balance in the test chamber, temperature and humidity are recorded, and thermal balance is verified via a thermocouple–based probe.

4.2 Intentional Emissions

4.2.1 Duty and Transmission Cycle, Pulsed Operation

The details and results of testing the EUT for pulsed operation are summarized in Table 4.

Table 4: Pulsed Emission Characteristics (Duty Cycle).

Frequency Range	**Det**	**IFBW**	**VBW**	**Test Date:**	6-Mar-17
f > 1 000 MHz	Pk	3 MHz	10 MHz	**Test Engineer:**	Joseph Brunett
				EUT	Allegion BR400
				Meas. Distance:	Conducted

Pulsed Operation / Duty Cycle								
Transmit Mode	Symbol Rate (Msym/s)	Data Rate (Mbps)	Voltage (V)	Oper. Freq (MHz)	Tx Cycle Time* (ms)	On-Time* (ms)	Duty Cycle (%)	Power Duty Correction (dB)
LE (Cont. Modulated)	-	2	115.0	2440.0	0.626	0.352	56.2	2.5

Equipment Used: RSFSV30001

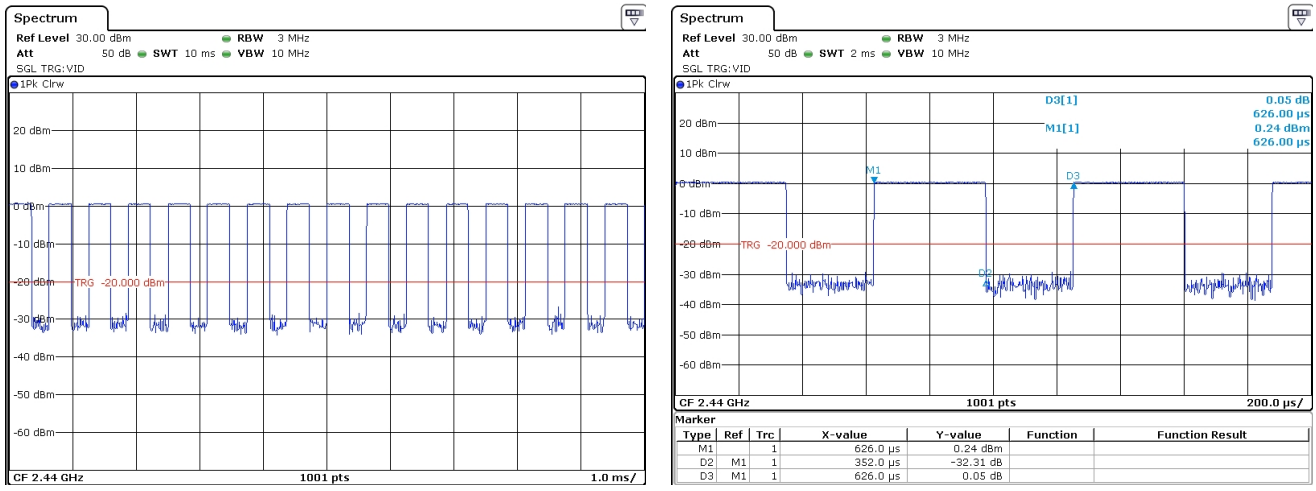


Figure 8: Pulsed Emission Characteristics (Duty Cycle).

4.2.2 Fundamental Emission Bandwidth

Emission bandwidth (EBW) of the EUT is measured with the device placed in the test mode(s) with the shortest available packet length and minimum packet spacing. Radiated emissions are recorded following the test procedures listed in Section 2.1. The 6 dB bandwidth is measured for the lowest, middle, and highest channels available. The 99% emission bandwidth per IC test procedures is also reported.The results of this testing are summarized in Table 5. Plots showing measurements employed obtain the emission bandwidths reported are provided in Figure 9.

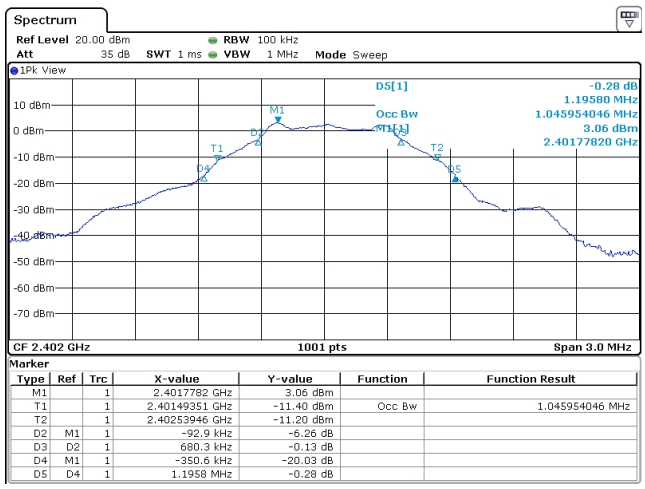
Table 5: Intentional Emission Bandwidth.

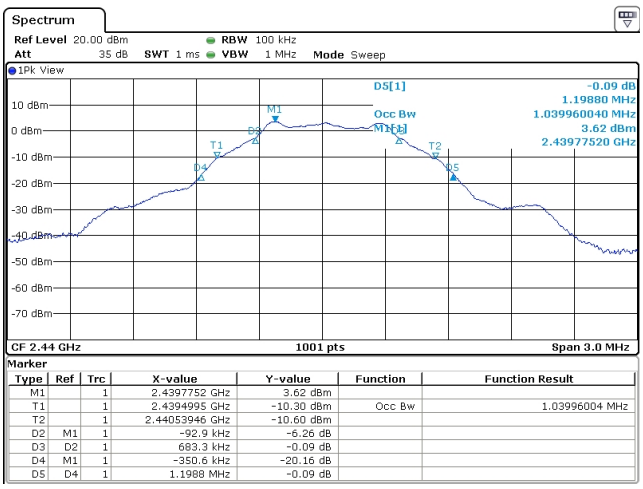
Frequency Range	**Det**	**IFBW**	**VBW**		
f > 1 000 MHz	Pk	100 kHz	1 MHz	**Test Date:**	03/10/17
f > 1 000 MHz	Pk	100 kHz	1 MHz	**Test Engineer:**	Joseph Brunett
				EUT	Allegion BR400
				Meas. Distance:	Conducted

Occupied Bandwidth									
Transmit Mode	Symbol Rate (Msym/s)	Data Rate* (Mbps)	Voltage (V)	Oper. Freq (MHz)	6 dB BW (MHz)	6 dB BW Limit (MHz)	99% OBW (MHz)	20 dB BW (MHz)	Pass/Fail
LE (Cont. Modulated)	-	2.0	115.0	2402.0	0.680	0.500	1.046	1.196	Pass
				2440.0	0.683	0.500	1.040	1.199	Pass
				2480.0	0.674	0.500	1.031	1.196	Pass

* Over all modes of operation, the worst case (highest data rate) in each form of modulation was tested to demonstrate compliance.

Equipment Used: RSFSV30001





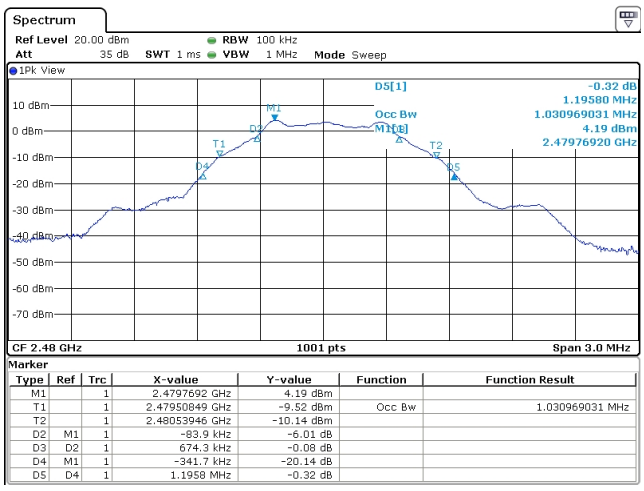


Figure 9: Intentional Emission Bandwidth.

4.2.3 Effective Isotropic Radiated Power

The EUT's radiated power is computed from antenna port conducted power measurements and the gain of the EUT antenna(s). Where the EUT is not sold with an antenna connector, a modified product has been provided including such. Peak conducted output power was measured directly from the EUT at the port where the antenna attaches. The test receiver bandwidth was set to be greater than the measured emission bandwidth of the EUT to capture the true peak. Antenna gain is either provided directly by the antenna manufacturer or measured by comparison between calculated EIRP and conducted output power. Table 6 details the results of these measurements. Plots showing conducted measurements made are depicted in Figure 10.

Table 6: Radiated Power Results.

Frequency Range	**Det**	**IF Bandwidth**	**Video Bandwidth**	**Test Date:**	12-Apr-15
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	120 kHz	300 kHz	**Test Engineer:**	Joseph Brunett
f > 1 000 MHz	Pk/Avg	3 MHz	3 MHz	**EUT:**	Allegion BR400
				Meas. Distance:	3m

FCC/IC

#	Mode	Channel	Freq. MHz	Ant. Used	Ant. Pol.	Pr (Pk)** (dBm)	Ka (dB/m)	Kg (dB)	EIRP (Pk)*** (dBm)	Pout* (Pk) (dBm)	Calc Ant Gain (dBi)	EIRP (Avg) Limit (dBm)	Pass (dB)
1	LE	L	2402.0	HRNQR316401	H/V		21.4	0.0	6.2	2.6	3.6	30.0	23.8
2		M	2440.0	HRNQR316401	H/V		21.5	0.0	6.1	3.3	2.8	30.0	23.9
3		H	2480.0	HRNQR316401	H/V		21.7	0.0	6.5	3.9	2.6	30.0	23.5
4													
#	Mode	Channel	Freq. MHz	Supply Voltage	Ant. Pol.	Pr ** dBm	Ka dB/m	Kg dB	EIRP (Pk) dBm				
5	CW	M	2440.0	135.0	H/V		21.5	0.0	6.0				
6			2440.0	115.0	H/V		21.5	0.0	6.1				
7			2440.0	85.0	H/V		21.5	0.0	6.1				

* Measured conducted from the radio using conducted test sample. RBW >> OBW

** When E-field/EIRP is reported directly from Spectrum Analyzer, Antenna Factors and Cable losses are included directly in SA settings.

*** Measured radiated at 3 meter distance. Peak power measured with IFBW > OBW per DTS Procedures 9.1.1 RBW = DTS bandwidth

Equipment Used: RSFSV30001

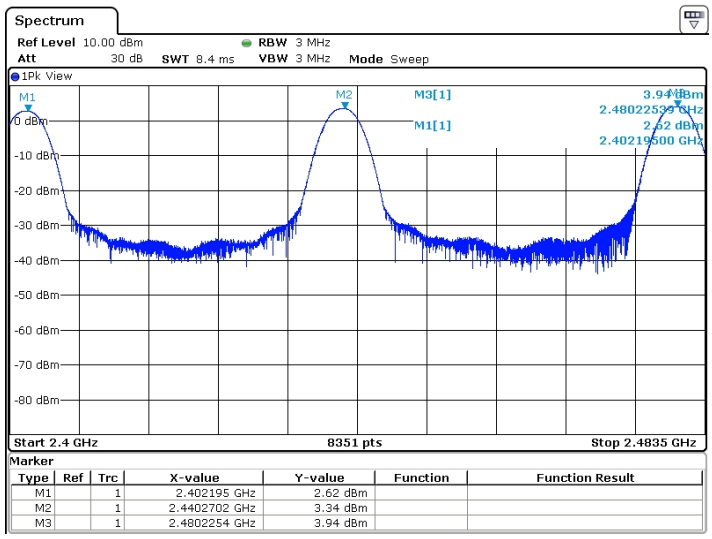


Figure 10: Conducted RF Power Plots

4.2.4 Power Spectral Density

For this test, the EUT was attached directly to the test receiver. Following FCC DTS measurement procedures, the emission spectrum is first scanned for maximum spectral peaks, the span and receiver bandwidth are then reduced until the power spectral density is measured in the prescribed receiver bandwidth. The results of this testing are summarized in Table 7. Plots showing how these measurements were made are depicted in Figure 11.

Table 7: Power Spectral Density Results.

Frequency Range	**Detector**	**IF Bandwidth**	**Video Bandwidth**	**Test Date:**	12-Mar-17
2400-2483.5	Pk	3 kHz	10 kHz	**Test Engineer:**	Joseph Brunett
				EUT:	Allegion BR400
	Equipment Used: RSFSV30001			**Meas. Distance:**	Conducted

						FCC/IC
Mode	Channel	Frequency (MHz)	Ant. Used	PSDcond (meas)* (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass By (dB)
Continuous Tx. LE	L	2402.0	Cond.	-12.3	8.00	20.3
	M	2441.0	Cond.	-11.4	8.00	19.4
	H	2480.0	Cond.	-10.9	8.00	18.9

* PSD measured conducted out the the EUT antenna port following FCC DTS PKPSD procedure.

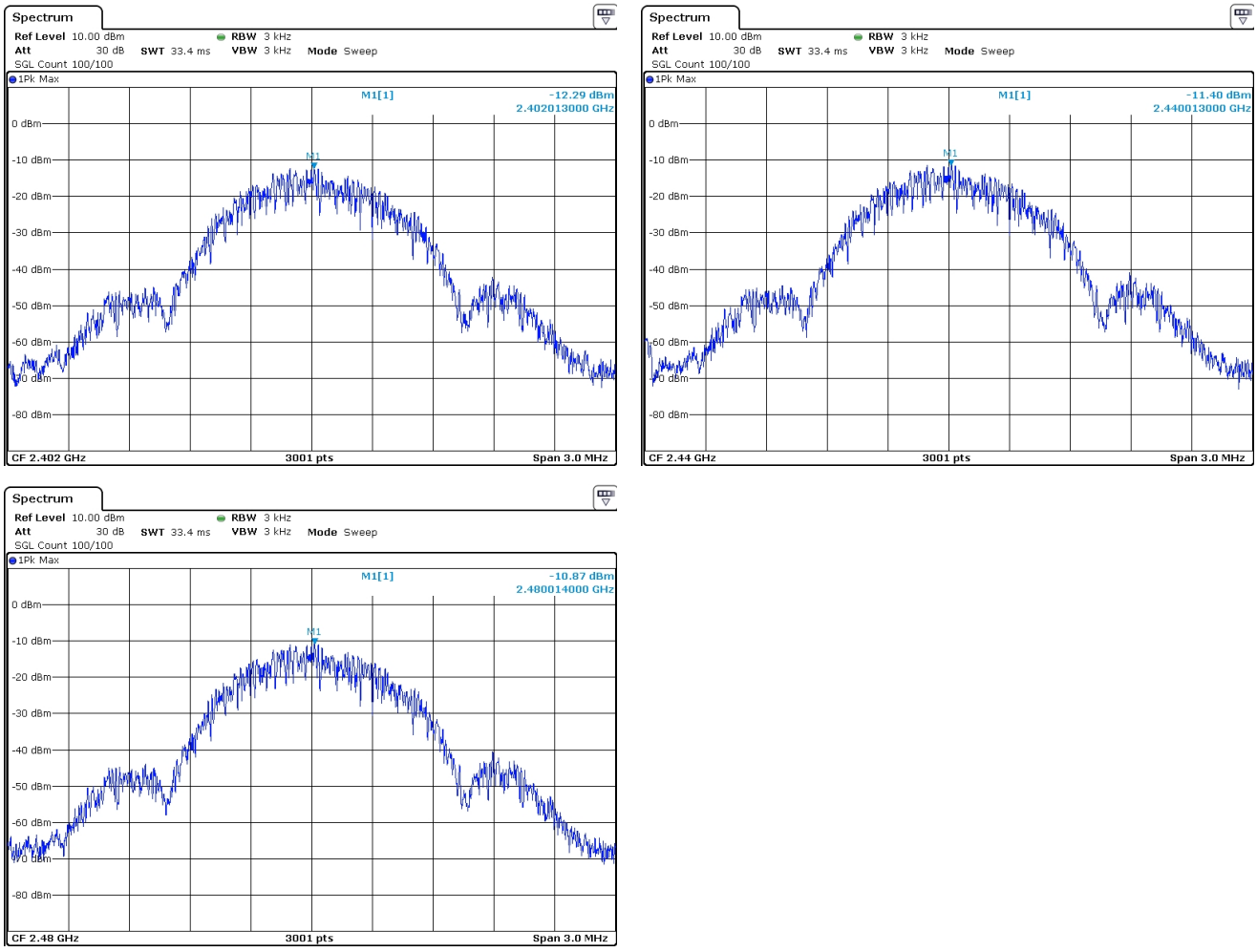


Figure 11: Power Spectral Density Plots.

4.2.5 Exposure and Potential Health Hazard

To demonstrate compliance with with regulations that place limitations on human electromagnetic field exposure for both the general public and for workers, we compute EIRP from measured emission data. These levels are compared with limits placed by the directives and recommendations detailed in Section 2.1. Table 8 details the results of these computations.

Table 8: Electromagnetic Field Exposure.

USA REF: 1.1310, 2.1091/1093, 447498 D01 General RF Exposure Guidance v06
IC REF: RSS-102 Issue 5, Safety Code 6
Min. Sep. Distance: 20 cm (Mobile)

Test Date: 30-Dec-99
Test Engineer: Joseph Brunett
EUT: 0
EUT Mode: Worst Case
Meas. Distance: 3 meters

Mode	Freq. MHz	Worst Case E3(Avg)* dBuV/m	E20cm(Avg) dBuV/m	H20cm(Avg) dBuA/m	Canada ISED RSS-102 MPE SC6 Limit (E20cm) dBuV/m	SC6 Limit (H20cm) dBuA/m	Worst Case MPE Ratio	USA FCC 1.1310 MPE E20cm Limit*** dBuV/m	H20cm Limit*** dBuA/m	Worst Case MPE Ratio

Mode	Freq. MHz	Worst Case EIRP(Avg)** dBm	E20cm(Avg) dBuV/m	S20cm(Avg)**** mW/cm2		SC6 Limit (S20cm) mW/cm2	MPE Ratio		S Limit mW/cm2	MPE Ratio
BLE Radio	2400-2483.5	6.50000	125.22183	0.00089		5.47422	0.00016		1.00000	0.00089
WiLAN (module)	2400-2483.5	16.54000	135.26183	0.00897		5.47422	0.00164		1.00000	0.00897
						MPE Total (<1):	**.002**		**MPE Total (<1):**	**.010**
						Complies?	**Yes**		Complies?	**Yes**

*As Measured / Computed from highest fundamental emission, see fundamental emission section of this report.
**EIRP, as computed from Modular Device RF Exposure Exhibits.
*** For FCC MPE, use of 300 kHz limit at frequencies below 300 kHz is applied (if applicable) as previously allowed by FCC.
**** EIRP (mW) = S (mW/cm^2) x 4 x PI x 20cm^2

4.3 Unintentional Emissions

4.3.1 Transmit Chain Spurious Emissions

The results for the measurement of transmit chain spurious emissions at the nominal voltage and temperature are provided in Table 9. Measurements are performed to 10 times the highest fundamental operating frequency.

Table 9: Transmit Chain Spurious Emissions.

Frequency Range	Det	IF Bandwidth	Video Bandwidth		
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	120 kHz	300 kHz	**Test Date:**	12-Mar-17
f > 1 000 MHz	Pk/Avg	1 MHz	3 MHz	**Test Engineer:**	Joseph Brunett
				EUT:	Allegion BR400
				Mode:	Modulated (L,M,H Channels)
				Meas. Distance:	3m

FCC/IC

#	Freq. Start MHz	Freq. Stop MHz	Ant. Used	Ant. Pol.	Pr (Pk) dBm	Pr (Avg)* dBm	Ka dB/m	Kg dB	E3(Pk) dBµV/m	E3 Pk Lim dBµV/m	E3(Avg)meas dBµV/m	E3(Avg)+Duty dBµV/m	E3 Avg Lim dBµV/m	Pass dB	Comments
1	Fundamental Restricted Band Edge (Low Side)														
2	2390.0	2390.0	HRNQR316401	H/V			32.1	-0.3	57.5	74.0	38.3	40.8	54.0	13.2	all channels
3	Fundamental Restricted Band Edge (High Side)														
4	2483.5	2483.5	HRNQR316401	H/V			32.8	-0.3	65.5	74.0	48.2	50.7	54.0	**3.3**	all channels
5	Harmonic / Spurious Emissions														
6	4808.0	4804.0	HRNQR316401	H/V			32.8	-0.5	58.1	74.0	45.4	47.9	54.0	6.1	
7	4880.0	4805.0	HRNQR316401	H/V			32.8	-0.5	57.7	74.0	45.0	47.5	54.0	6.5	
8	4950.0	4806.0	HRNQR316401	H/V			32.8	-0.5	57.8	74.0	45.1	47.6	54.0	6.4	
9	4000.0	6000.0	HRNQR316401	H/V			33.0	-0.6	58.1	74.0	45.4	47.9	54.0	6.1	max all channels
10	7212.0	7212.0	HQR2TO18S01	H/V			33.3	-0.7	60.6	74.0	47.9	50.4	54.0	3.6	
11	7320.0	7320.0	HQR2TO18S01	H/V			33.4	-0.7	58.6	74.0	45.9	48.4	54.0	5.6	
12	7425.0	7425.0	HQR2TO18S01	H/V			33.4	-0.7	57.7	74.0	45.0	47.5	54.0	6.5	
13	6000.0	8400.0	HQR2TO18S01	H/V			32.8	-0.8	57.9	74.0	47.9	50.4	54.0	3.6	max all channels
14	8400.0	12500.0	HQR2TO18S01	H/V			34.3	-1.1	51.7	74.0	41.7	44.2	54.0	9.8	Max all channels; noise
15	12500.0	18000.0	HQR2TO18S01	H/V			35.6	-1.6	48.7	74.0	38.7	41.2	54.0	12.8	Max all channels; noise
16	18000.0	26500.0	HRNK001	H/V			69.1	0.0	48.5	74.0	38.5	41.0	54.0	13.0	Max all channels; noise
17															
18															
19															
20															
21															
22															
23															
24															
25															

*Avg measurements made following DTS procedures, Section 13.3.2 for band edge, Section 12.2.5.2 for spurious harmonics.

** When E-field/EIRP is reported directly from Spectrum Analyzer, Antenna Factors and Cable losses are included directly in SA settings.

4.3.2 Relative Transmit Chain Spurious Emissions

The results for the measurement of transmit chain spurious emissions relative to the fundamental in a 100 kHz receiver bandwidth (at the nominal voltage and temperature) are provided in Figure 12 below.

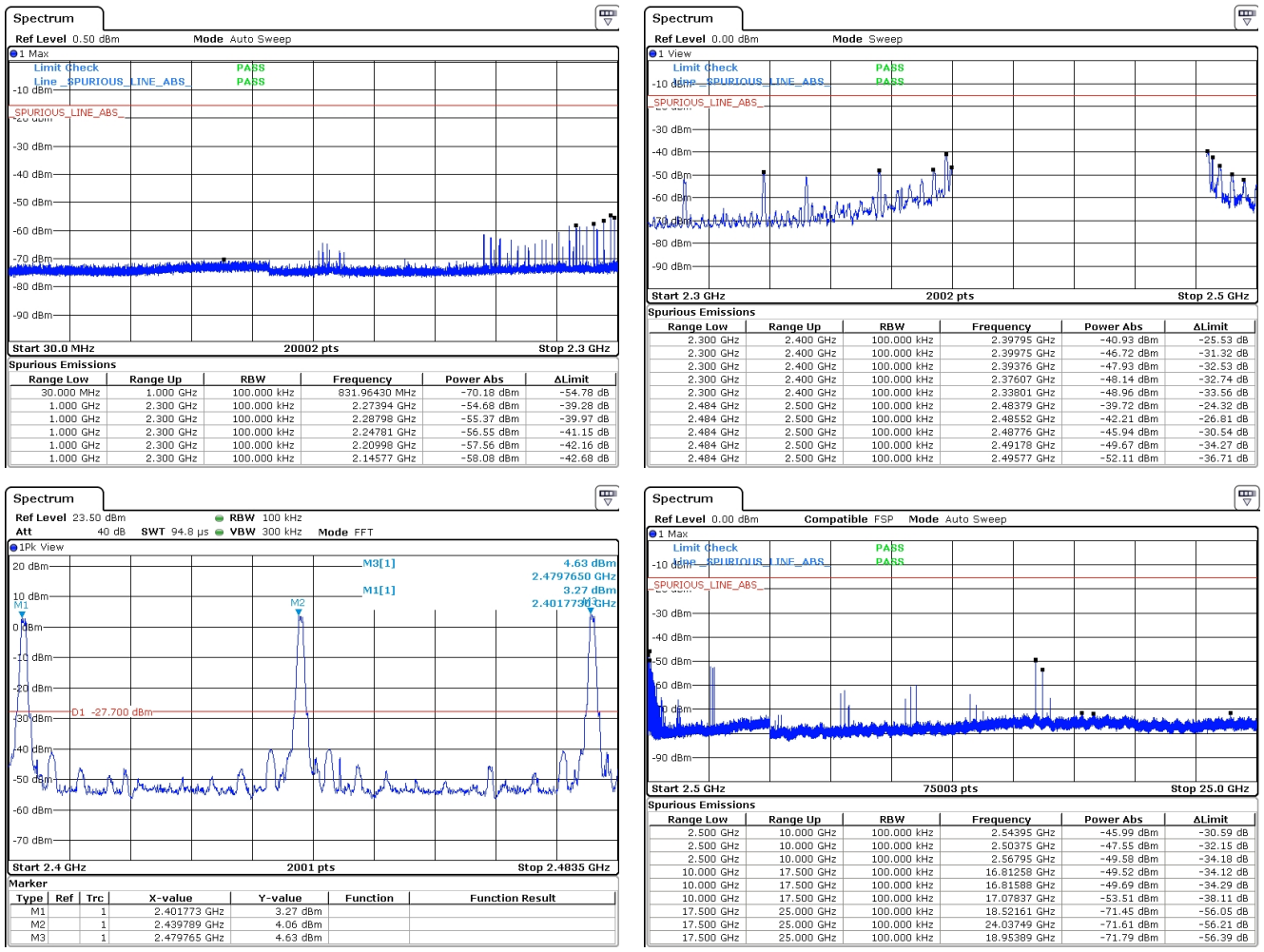


Figure 12: Conducted Transmitter Emissions Measured.

4.3.3 Conducted Emissions Test Results - AC Power Port(s)

The results of emissions from the EUT's AC mains power port(s) are reported in Table 10.

Table 10: AC Mains Power Conducted Emissions Results.

Frequency Range	**Det**	**IF Bandwidth**	**Video Bandwidth**	**Test Date:**	6-Mar-17
150kHz ≤ f ≤ 30 MHz	Pk/QPk/Avg	9 kHz	30 kHz	**Test Engineer:**	Joseph Brunett
				EUT Mode:	Cont Tx
				EUT:	Allegion BR400
				Meas. Distance:	AC Mains Conducted

AC Mains Power Conducted Emissions														
	Freq.	Line	Vmeas			Class A Qpk		Class A Avg		Class B Qpk		Class B Avg		
			Pk	Qpk	Avg	Vlim*	Margin	Vlim*	Margin	Vlim*	Margin	Vlim*	Margin	
#	MHz	Side	dBuV	dBuV	dBuV	dBuV	dB	dBuV	dB	dBuV	dB	dBuV	dB	Comments
1	0.27	L1	31.1			79.0	47.9	66.0	34.9	61.3	30.2	51.2	20.1	
2	0.35	L1	30.6			79.0	48.4	66.0	35.4	59.1	28.5	49.0	18.4	
3	0.62	L1	43.6	39.9	27.3	73.0	33.1	60.0	32.7	56.0	16.1	46.0	18.7	
4	0.56	L1	34.6	31.0	17.4	73.0	42.0	60.0	42.6	56.0	25.0	46.0	28.6	
5	1.25	L1	36.1	31.3	17.4	73.0	41.7	60.0	42.6	56.0	24.7	46.0	28.6	
6	1.96	L1	33.8	27.4	14.8	73.0	45.6	60.0	45.2	56.0	28.6	46.0	31.2	
7	2.01	L1	32.4			73.0	40.6	60.0	27.6	56.0	23.6	46.0	13.6	
8	26.49	L1	10.1			73.0	62.9	60.0	49.9	60.0	49.9	50.0	39.9	
9														
10	0.21	L2	30.7			79.0	48.3	66.0	35.3	63.3	32.6	53.2	22.5	
11	0.28	L2	34.2			79.0	44.8	66.0	31.8	60.9	26.7	50.8	16.6	
12	0.35	L2	35.3			79.0	43.7	66.0	30.7	59.1	23.8	49.0	13.7	
13	0.40	L2	36.8	33.4	19.5	79.0	45.6	66.0	46.5	57.9	24.5	47.8	28.3	
14	0.61	L2	48.5	45.1	31.7	73.0	27.9	60.0	28.3	56.0	10.9	46.0	14.3	
15	1.24	L2	42.2	37.5	21.7	73.0	35.5	60.0	38.3	56.0	18.5	46.0	24.3	
16	1.97	L2	39.4	33.4	17.0	73.0	39.6	60.0	43.0	56.0	22.6	46.0	29.0	
17	2.01	L2	38.1			73.0	34.9	60.0	21.9	56.0	17.9	46.0	**7.9**	
18	21.00	L3	21.7			73.0	51.3	60.0	38.3	60.0	38.3	50.0	28.3	
19														
20														

**In all cases, VPk ≥ VQpk ≥ VAve. If VPk < Vavg limit, then VQPk limit and Vavg limit are met.*

5 Measurement Uncertainty

The maximum values of measurement uncertainty for the laboratory test equipment and facilities associated with each test are given in the table below. This uncertainty is computed for a 95.45% confidence level based on a coverage factor of $k = 2$.

Table 11: Measurement Uncertainty.

Measured Parameter	**Measurement Uncertainty**[†]
Radio Frequency	$\pm(f_{Mkr}/10^7 + RBW/10 + (SPN/(PTS-1))/2 + 1\,\text{Hz})$
Conducted Emm. Amplitude	$\pm 1.8\,\text{dB}$
Radiated Emm. Amplitude $(30 - 200\,\text{MHz})$	$\pm 2.7\,\text{dB}$
Radiated Emm. Amplitude $(200 - 1000\,\text{MHz})$	$\pm 2.5\,\text{dB}$
Radiated Emm. Amplitude $(f > 1000\,\text{MHz})$	$\pm 3.7\,\text{dB}$
DC and Low Frequency Voltages	$\pm 2\%$
Temperature	$\pm 0.5°\text{C}$
Humidity	$\pm 5\%$

[†]Ref: CISPR 16-4-2:2011+A1:2014