

Test Report

Report No.: EED32H002557

Page 1 of 25

Client : Hull Base International Ltd.
Address : Room 1101, 11/F , New Lee Wah Centre, 88 Tokwawan Road, Tokwawan, Hong Kong

Description of the submitted sample(s):

Product : 2.4GHz Wireless Monitoring System
Model/Type reference : H111M, H111, H111-#, H111M-#, BCV-301M
Brand Name: : Hestia, Lil Jumbl
FCC ID : XGGH111M15
State of Sample(s) : NORMAL
Sample Quantity : 1 piece
Manufacturer : Hull Base International Ltd.

Sample Received Date : 2015-10-02
Sample tested Date : 2015-10-16 to 2015-11-05
Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2014 and ANSI C63.10:2013 for FCC Certification.

Conclusion(s): The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remark: The tested sample(s) and the sample information are provided by the client.

Reviewed by:

Enon - Li

Approved by:

Sheek , Luo

Date:

Dec. 11, 2015

Centre Testing International Group Co., Ltd.
Report Seal

Sheek Luo
Lab supervisor

Check No.:2308454696

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China

Test Report

Report No.: EED32H002557

Page 2 of 25

CONTENT:

Cover	Page 1 of 21
Content	Page 2 of 21

1.0 General Details

1.1	Equipment Under Test [EUT] Description of EUT operation	Page 3 of 21
1.2	Description of EUT Operation	
1.3	Date of Order	Page 3 of 21
1.4	Submitted Sample	Page 3 of 21
1.5	Test Duration	Page 3 of 21
1.6	Country of Origin	Page 3 of 21

2.0 Technical Details

2.1	Investigations Requested	Page 4 of 21
2.2	Test Standards and Results Summary	Page 4 of 21

3.0 Test Results

3.1	Emission	Page 5-20 of 21
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Appendix A

List of Measurement Equipment	Page 21 of 21
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Appendix B

Photographs	Page 22 - 23 of 23
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Test Report

Report No.: EED32H002557

Page 3 of 25

1.0 General Details

1.1 Equipment Under Test [EUT] Description of Sample(s)

Product: 2.4GHz Wireless Monitoring System
Manufacturer: Hull Base International Ltd.
Room 1101, 11/F , New Lee Wah Centre, 88 Tokwawan Road, Tokwawan, Hong Kong.
Brand Name: Hestia, Lil Jumbl
Model Number: H111M, H111, H111-#, H111M-#, BCV-301M
Rating: 6Vd.c. (Powered by DC power supply)
The AC/DC Adaptor used for the tests was provided by the applicant with the following details: Two pins (Live / Neutral) only adaptor, Model Number: S08-006-0060-00800 / K05S 060080U, Input: 100-240Va.c. 50/60Hz 0.2A Max, Output: 6Vd.c. 800mA
Model difference: All models are same except silk screens, the test models is H111M and the test results are applicable to other.
can be A-Z denoting for color and different packaging, Such as "G" is green etc.

1.2 Description of EUT Operation

The Equipment Under Test (EUT) is the (Monitor) unit of the 2.4GHz Wireless Monitoring System which a FHSS transceiver operating in 2.4GHz to 2.4835 GHz band, and the transmitting frequency is generated by Y1(18MHz crystal). The operation is achieved by different combinations of frequency modulated signal on the 2410.875~2471.625MHz carrier frequency. The EUT is an Adaptive Frequency Hopping systems and the type of modulation is pulse modulation.

1.3 Date of Order

2015-10-02

1.4 Submitted Sample(s):

2 Samples

1.5 Test Duration

2015-10-16 to 2015-11-05

1.6 Country of Origin

China

Test Report

Report No.: EED32H002557

Page 4 of 25

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2014 Regulations and ANSI C63.10:2013 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary				
Test Condition	Test Requirement	Test Method	Class / Severity	
			Pass	Fail
Field Strength of Fundamental & Harmonics Emissions #	FCC 47CFR 15.249	ANSI C63.10:2013	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
20 dB Bandwidth #	FCC 47CFR 15.215(c)	ANSI C63.10:2013	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
Radiated Emissions #	FCC 47CFR 15.209	ANSI C63.10:2013	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>
Conducted Emissions #	FCC 47CFR 15.207	ANSI C63.10:2013	N/A	<input checked="" type="checkbox"/> <input type="checkbox"/>

Remark: 1. “#” indicates the testing item was fulfilled by subcontracted lab.

2. The only worse case test result is listed in the report.

Note: N/A - Not Applicable

Test Report

Report No.: EED32H002557

Page 5 of 25

3.0 Test Results

3.1 Emission

3.1.1 Field Strength of Fundamental & Harmonics Emissions

Test Requirement:	FCC 47CFR 15.249
Test Method:	ANSI C63.10:2013
Test Date:	2015-10-16
Mode of Operation:	Communication mode with charging function

Test Method:

The sample was placed 0.8m above the ground plane on a standard radiated emission test site. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. In the frequency range of 9kHz to 30MHz, The center of the loop antenna shall be 1 meter above the ground and rotated loop axis for maximum reading. The emissions worst-case are shown in Test Results of the following pages.

Remark: 3 orthogonal axis apply to hand-held device only.

*: Semi-anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Test Report

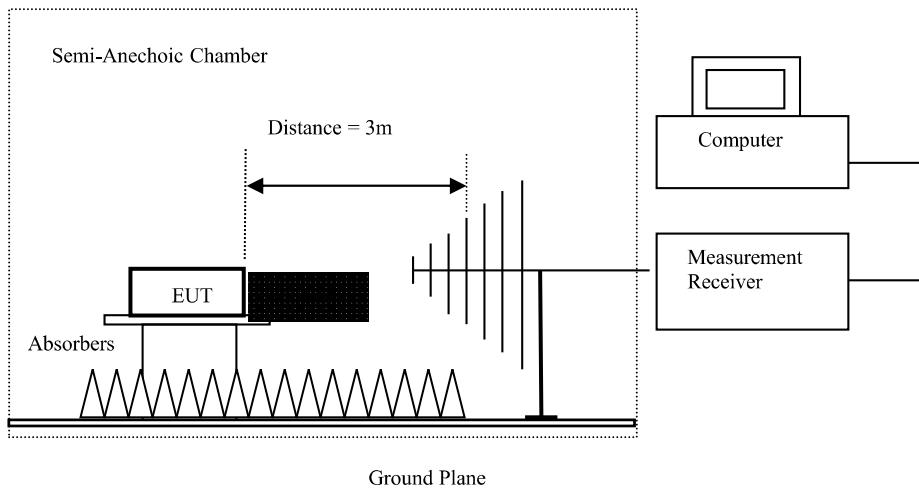
Report No.: EED32H002557

Page 6 of 25

Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	RBW: 10kHz VBW: 30kHz Sweep: Auto Span: Fully capture the emissions being measured Trace: Max. hold
30MHz – 1GHz (QP)	RBW: 120kHz VBW: 120kHz Sweep: Auto Span: Fully capture the emissions being measured Trace: Max. hold
Above 1GHz (Pk & Av)	RBW: 3MHz VBW: 3MHz Sweep: Auto Span: Fully capture the emissions being measured Trace: Max. hold

Test Setup:



Absorbers placed on top of the ground plane are for measurements above 1000MHz only.

Test Report

Report No.: EED32H002557

Page 7 of 25

Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Fundamental frequency [MHz]	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

Result of Communication mode with charging function (1GHz~18GHz) – Lowest Frequency: PASS

Field Strength of Fundamental and Harmonics Emissions						
Peak Value						
Frequency	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
MHz						
2411.2	76.1	27.8	103.9	156,675.1	500,000	Vertical
*	4823.6	21.1	32.3	53.4	467.7	Vertical
	7234.5	-4.9	37.2	32.3	41.2	Vertical
	9644.8				5,000	Vertical
*	12056.0				5,000	Vertical
	14467.2				5,000	Vertical
	16878.4				5,000	Vertical
*	19289.6			Emissions detected are more than 20 dB below the FCC Limits	5,000	Vertical
	21700.8				5,000	Vertical
	24112.0				5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions						
Average Value						
Frequency	Measured Level @3m dB μ V/m	Correction Factor dB μ V/m	Field Strength dB μ V/m	Field Strength μ V/m	Limit @3m μ V/m	E-Field Polarity
MHz						
2411.2	35.6	27.8	63.4	1,479.1	50,000	Vertical
*	4823.6	-3.8	32.3	28.5	26.6	Vertical
	7234.5	-7.1	37.2	30.1	32.0	Vertical
	9644.8				500	Vertical
*	12056.0				500	Vertical
	14467.2				500	Vertical
	16878.4			Emissions detected are more than 20 dB below the FCC Limits	500	Vertical
*	19289.6				500	Vertical
	21700.8				500	Vertical
	24112.0				500	Vertical

Test Report

Report No.: EED32H002557

Page 8 of 25

Result of Communication mode with charging function (1GHz~18GHz) – Middle Frequency: PASS

Field Strength of Fundamental and Harmonics Emissions						
Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Field Strength	Limit @3m	E-Field Polarity
MHz	dB μ V/m	dB μ V/m	dB μ V/m	μ V/m	μ V/m	
2441.8	77.1	27.8	104.9	175,792.4	500,000	Vertical
*	4882.9	24.3	32.5	56.8	5,000	Vertical
*	7320.9	-3.8	37.5	33.7	5,000	Vertical
9767.2					5,000	Vertical
*	12209.0				5,000	Vertical
14650.8					5,000	Vertical
17092.6					5,000	Vertical
*	19534.4				5,000	Vertical
21976.2					5,000	Vertical
24418.0					5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions						
Average Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Field Strength	Limit @3m	E-Field Polarity
MHz	dB μ V/m	dB μ V/m	dB μ V/m	μ V/m	μ V/m	
2441.8	37.5	27.8	65.3	1,840.8	50,000	Vertical
*	4882.9	-3.2	32.5	29.3	500	Vertical
*	7320.9	-7.4	37.5	30.1	500	Vertical
9767.2					500	Vertical
*	12209.0				500	Vertical
14650.8					500	Vertical
17092.6					500	Vertical
*	19534.4				500	Vertical
21976.2					500	Vertical
24418.0					500	Vertical

Test Report

Report No.: EED32H002557

Page 9 of 25

Result of Communication mode with charging function (1GHz~18GHz) – Highest Frequency: PASS

Field Strength of Fundamental and Harmonics Emissions						
Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Field Strength	Limit @3m	E-Field Polarity
MHz	dB μ V/m	dB μ V/m	dB μ V/m	μ V/m	μ V/m	
2472.4	78.1	27.8	105.9	197,242.3	500,000	Vertical
*	4942.3	26.6	32.5	59.1	5,000	Vertical
*	7415.3	-3.5	37.8	34.3	5,000	Vertical
9889.6					5,000	Vertical
*	12362.0				5,000	Vertical
14834.4					5,000	Vertical
17306.8					5,000	Vertical
*	19779.2				5,000	Vertical
22251.6					5,000	Vertical
24724.0					5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions						
Average Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Field Strength	Limit @3m	E-Field Polarity
MHz	dB μ V/m	dB μ V/m	dB μ V/m	μ V/m	μ V/m	
2472.4	38.3	27.8	66.1	2,018.4	50,000	Vertical
*	4942.3	-1.8	32.5	30.7	34.3	500
*	7415.3	-5.9	37.8	31.9	39.4	500
9889.6					500	Vertical
*	12362.0				500	Vertical
14834.4					500	Vertical
17306.8					500	Vertical
*	19779.2				500	Vertical
22251.6					500	Vertical
24724.0					500	Vertical

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

*: Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Calculated measurement uncertainty	:	9kHz to 30MHz	2.4dB
		30MHz to 1GHz	4.9dB
		1GHz to 6GHz	4.02dB
		6GHz to 18GHz	4.03dB

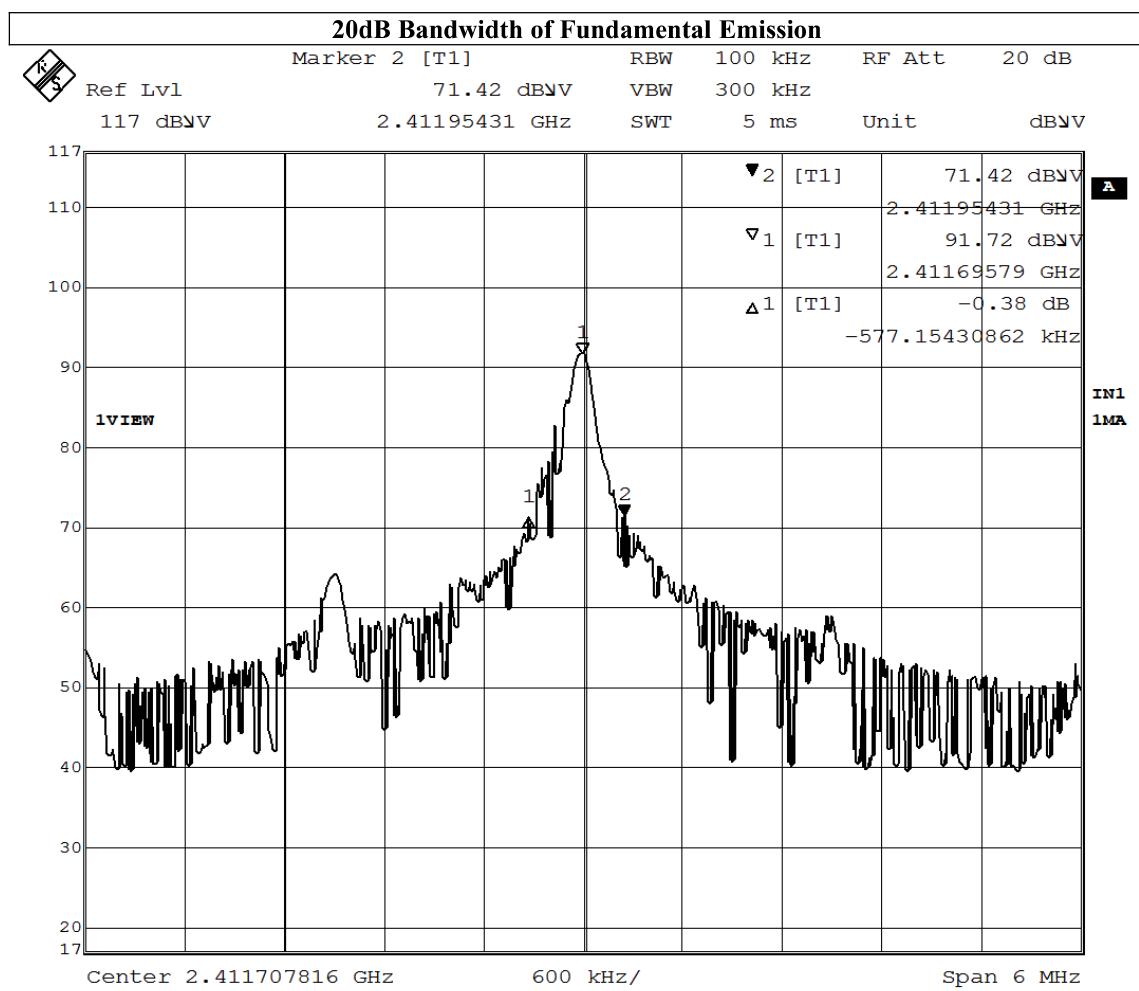
Test Report

Report No.: EED32H002557

Page 10 of 25

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]
2411.75	577.2

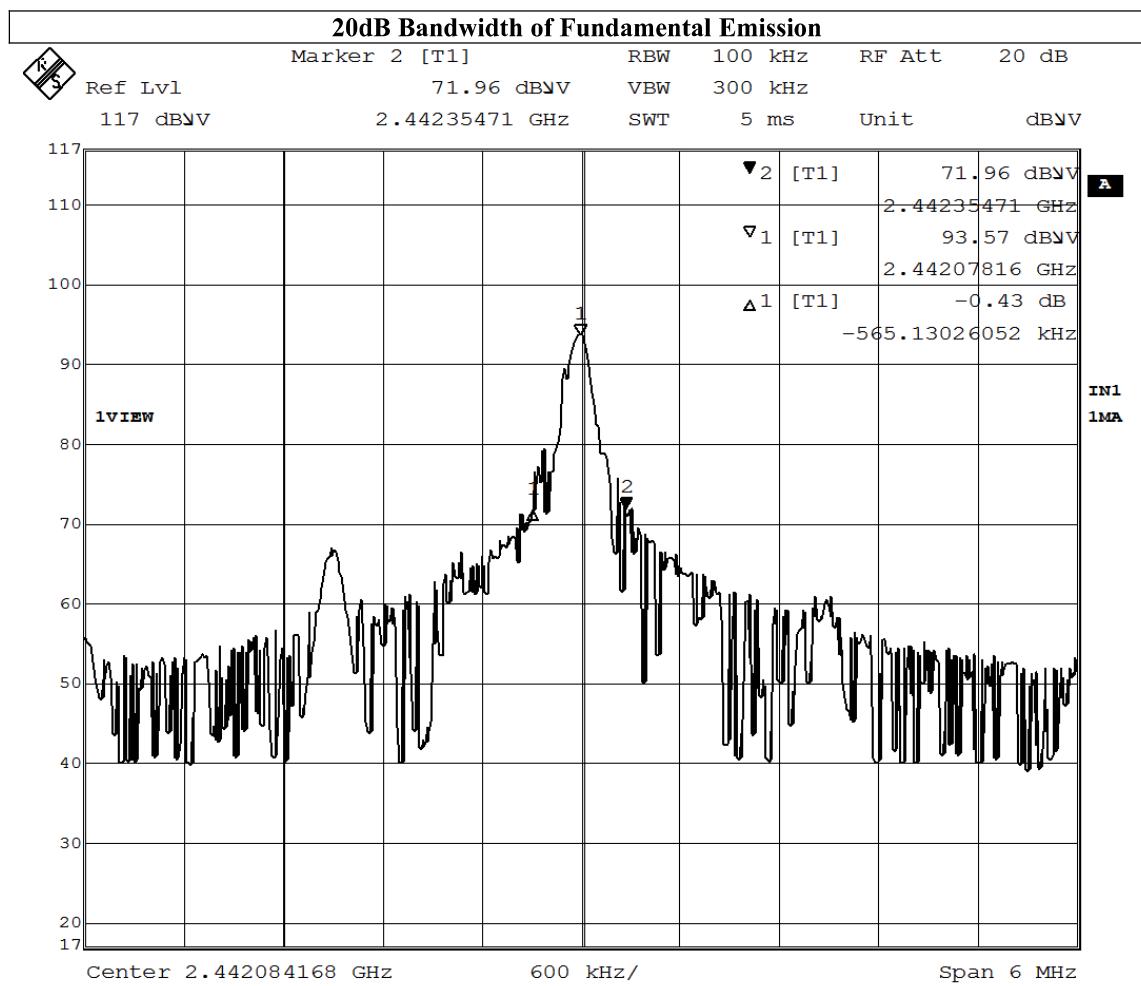


Test Report

Report No.: EED32H002557

Page 11 of 25

Frequency Range [MHz]	20dB Bandwidth [kHz]
2442.1	565.1

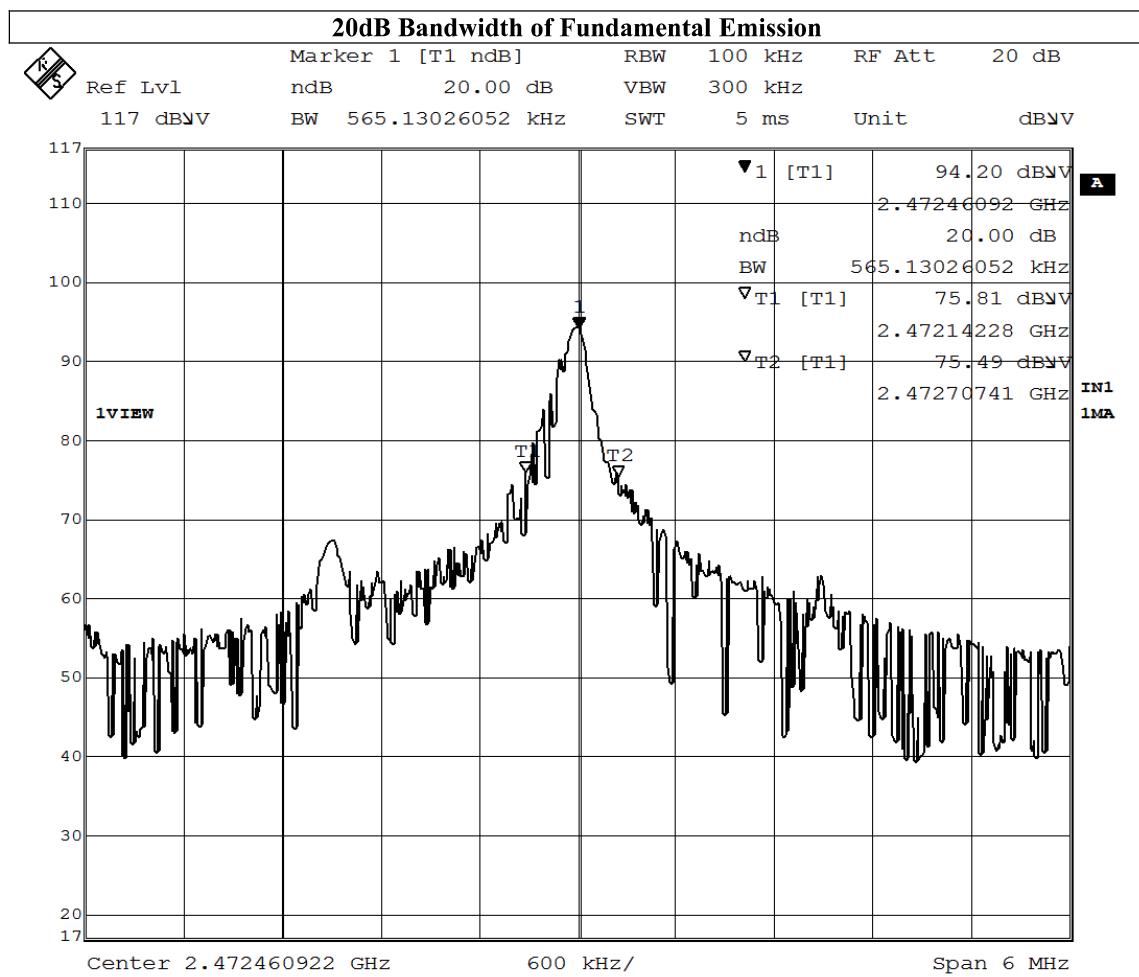


Test Report

Report No.: EED32H002557

Page 12 of 25

Frequency Range [MHz]	20dB Bandwidth [kHz]
2472.4	565.1



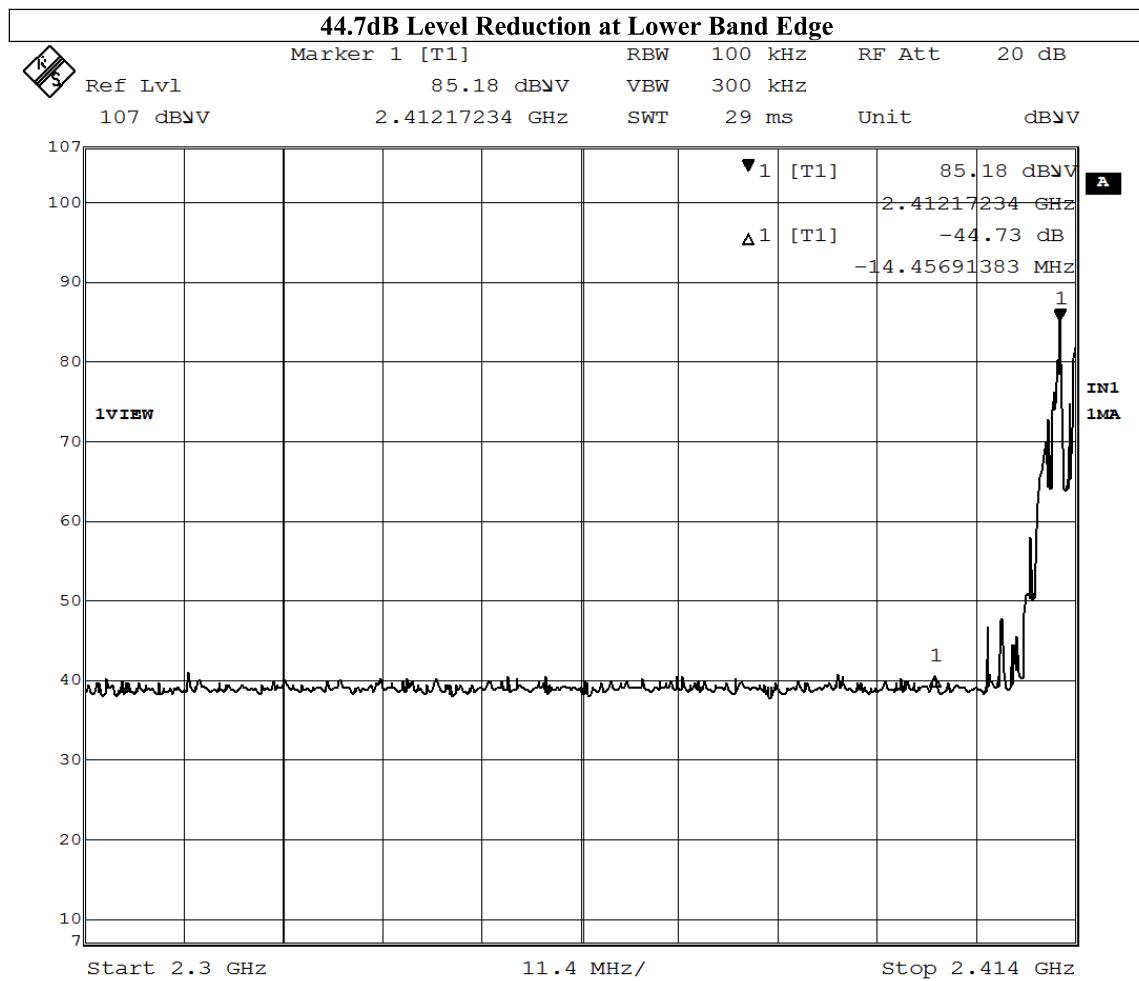
Test Report

Report No.: EED32H002557

Page 13 of 25

Band Edge Measurement:

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
Lowest Fundamental	44.7



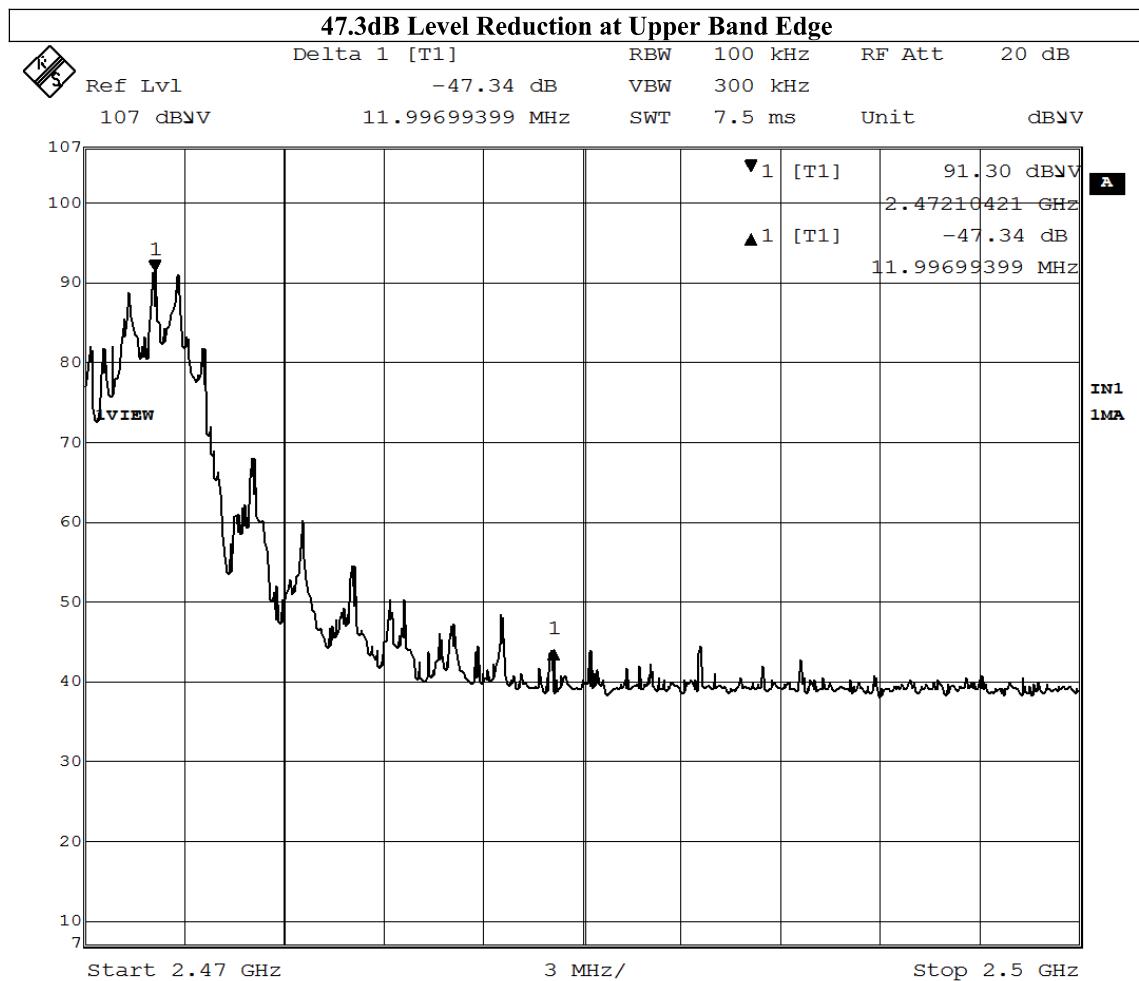
Test Report

Report No.: EED32H002557

Page 14 of 25

Band Edge Measurement:

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
Highest Fundamental	47.3



Test Report

Report No.: EED32H002557

Page 15 of 25

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above 960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Communication mode with charging function, (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the FCC Limits

Result of Communication mode with charging function, (30MHz – 1GHz): PASS

Field Strength of Spurious Emissions						
Quasi-Peak						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dB μ V	dB/m	dB μ V/m	dB μ V/m	dB μ V/m	
219.0	15.9	14.4	30.3	43.5	13.2	Horizontal
384.0	14.4	19.6	34.0	46.0	12.0	Horizontal
480.0	14.4	22.6	37.0	46.0	9.0	Horizontal
576.0	13.5	24.4	37.9	46.0	8.1	Horizontal
768.1	10.9	28.1	39.0	46.0	7.0	Horizontal

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 4.9dB
1GHz to 6GHz 4.02dB
6GHz to 18GHz 4.03dB

Test Report

Report No.: EED32H002557

Page 16 of 25

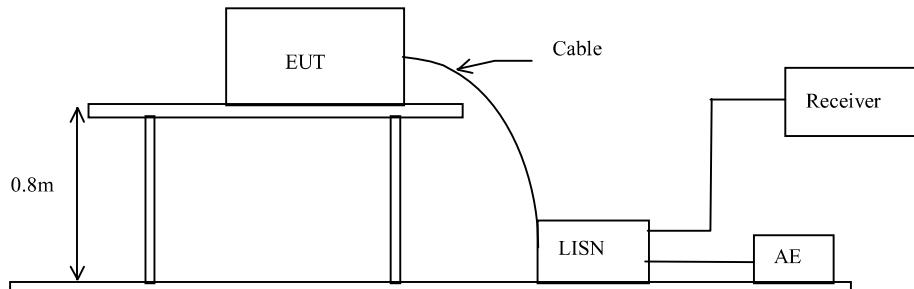
3.1.3 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2009
Test Date:	2015-10-16
Mode of Operation:	Communication mode with charging function
Test Voltage:	120V _{a.c.} , 60Hz

Test Method:

The test was performed in accordance with ANSI C63.4: 2009, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



Test Report

Report No.: EED32H002557

Page 17 of 25

Limit for Conducted Emissions (FCC 47 CFR 15.207):

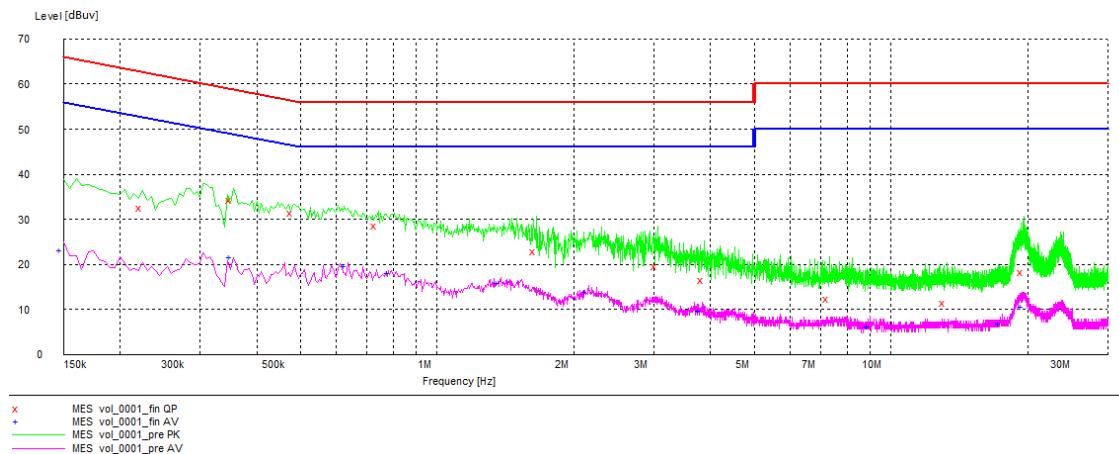
Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Communication mode with charging function: PASS

Please refer to the following diagram for individual results.



Test Report

Report No.: EED32H002557

Page 18 of 25

Results of Communication mode with charging function - Live: PASS

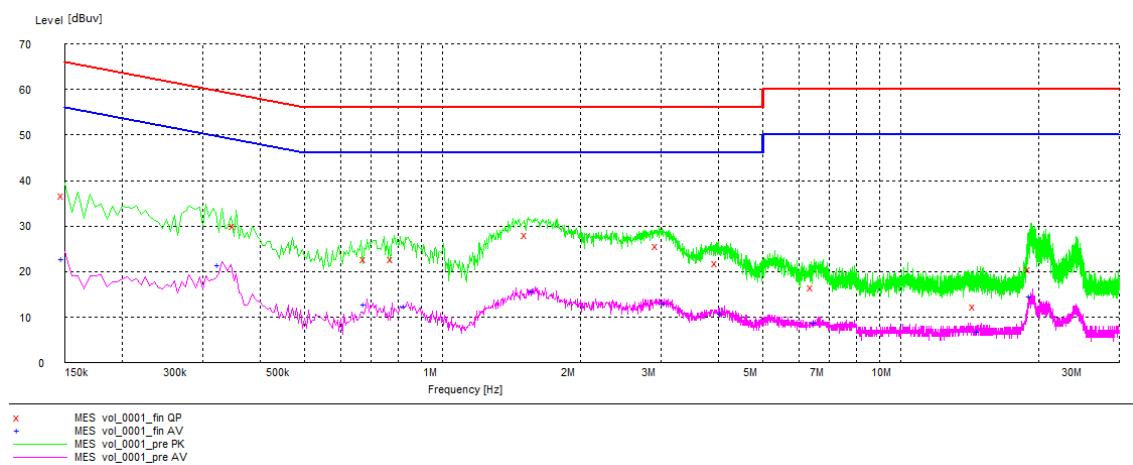
Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dB μ V	dB μ V	dB μ V	dB μ V
Live	0.150	-*-	-*-	23.1	56.0
Live	0.225	32.5	63.0	-*-	-*-
Live	0.355	34.2	59.0	21.6	49.0
Live	0.485	31.4	56.0	-*-	-*-
Live	0.635	-*-	-*-	19.6	46.0
Live	0.740	28.5	56.0	-*-	-*-
Live	0.790	-*-	-*-	18.1	46.0
Live	1.380	-*-	-*-	15.9	46.0
Live	1.660	22.8	56.0	-*-	-*-
Live	2.155	-*-	-*-	13.8	46.0
Live	3.065	19.5	56.0	-*-	-*-
Live	3.825	-*-	-*-	9.6	46.0
Live	3.880	16.4	56.0	-*-	-*-
Live	7.325	12.4	60.0	-*-	-*-
Live	8.985	-*-	-*-	6.2	50.0
Live	13.260	11.5	60.0	-*-	-*-
Live	17.555	-*-	-*-	6.9	50.0
Live	19.615	18.3	60.0	-*-	-*-
Live	19.625	-*-	-*-	10.5	50.0

Test Report

Report No.: EED32H002557

Page 19 of 25

Results of Communication mode with charging function - Neutral: PASS
Please refer to the following diagram for individual results.



Test Report

Report No.: EED32H002557

Page 20 of 25

Results of Communication mode with charging function - Neutral: PASS

Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dB μ V	dB μ V	dB μ V	dB μ V
Neutral	0.150	36.7	66.0	22.7	56.0
Neutral	0.330	-*-	-*-	21.5	50.0
Neutral	0.355	30.1	59.0	-*-	-*-
Neutral	0.685	22.7	56.0	12.7	46.0
Neutral	0.785	22.7	56.0	-*-	-*-
Neutral	0.840	-*-	-*-	12.2	46.0
Neutral	1.540	28.1	56.0	-*-	-*-
Neutral	1.600	-*-	-*-	15.6	46.0
Neutral	2.970	25.6	56.0	-*-	-*-
Neutral	3.100	-*-	-*-	12.9	46.0
Neutral	4.010	21.8	56.0	-*-	-*-
Neutral	4.125	-*-	-*-	10.7	46.0
Neutral	6.485	16.4	60.0	-*-	-*-
Neutral	6.590	-*-	-*-	8.7	50.0
Neutral	14.665	12.4	60.0	-*-	-*-
Neutral	14.960	-*-	-*-	6.8	50.0
Neutral	19.360	20.4	60.0	-*-	-*-
Neutral	19.380	-*-	-*-	14.5	50.0

Remarks:

Calculated measurement uncertainty (0.15MHz – 30MHz): 3.2dB

-*- Emission(s) that is far below the corresponding limit line.

Test Report

Report No.: EED32H002557

Page 21 of 25

Appendix A

LIST OF MEASUREMENT EQUIPMENT

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM299	DOUBLE-RIDGED WAVEGUIDE HORN ANTENNA	ETS-LINDGREN	3115	00114120	2014/01/15	2016/01/25
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-LINDGREN	FACT-3	--	2015/09/25	2016/09/25
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2015/06/01	2016/06/01
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2014/01/15	2016/01/15
EM527	MICROWAVE FREQUENCY CABLE	SUHNER	SUCOFLEX 102	24514	2013/08/26	2016/08/26
EM528	MICROWAVE FREQUENCY CABLE	SUHNER	SUCOFLEX 102	24515	2013/08/26	2016/08/26
EM529	MICROWAVE FREQUENCY CABLE	SUHNER	SUCOFLEX 104	238296	2014/07/24	2016/07/24
EM530	MICROWAVE FREQUENCY CABLE	SUHNER	SUCOFLEX 102	24970	2013/08/26	2016/08/26

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM232	LISN	SCHAFFNER	NNB41	04/100082	2014/12/08	2015/12/08
EM179	IMPULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	357-8810.52/54	2015/01/14	2016/01/14
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740-057-99A	2012/02/03	2017/02/03

Remarks:

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined