Test Report

Report No.: EED32H002556 **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	: H111C, H111, H111-#, H111C-#, BCV-301M
Brand Name:	: Hestia, Lil Jumbl
FCC ID	: XGGH111C15
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 2015-11-13
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: Emen Li

Approved by: Sheek Luo Date: Dec. 11, 2015

Sheek Luo
Lab supervisor

Check No.:2308454696

Test Report

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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:	H111C, H111, H111-#, H111C-#, 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 H111C 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 (Camera) 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 2015-11-13

1.6 Country of Origin

China

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	Test Result	
				Pass	Fail
Field Strength of Fundamental & Harmonics Emissions #	FCC 47CFR 15.249	ANSI C63.10:2013	N/A	☒	☐
20 dB Bandwidth#	FCC 47CFR 15.215(c)	ANSI C63.10:2013	N/A	☒	☐
Radiated Emissions #	FCC 47CFR 15.209	ANSI C63.10:2013	N/A	☒	☐
Conducted Emissions #	FCC 47CFR 15.207	ANSI C63.10:2013	N/A	☒	☐

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

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.

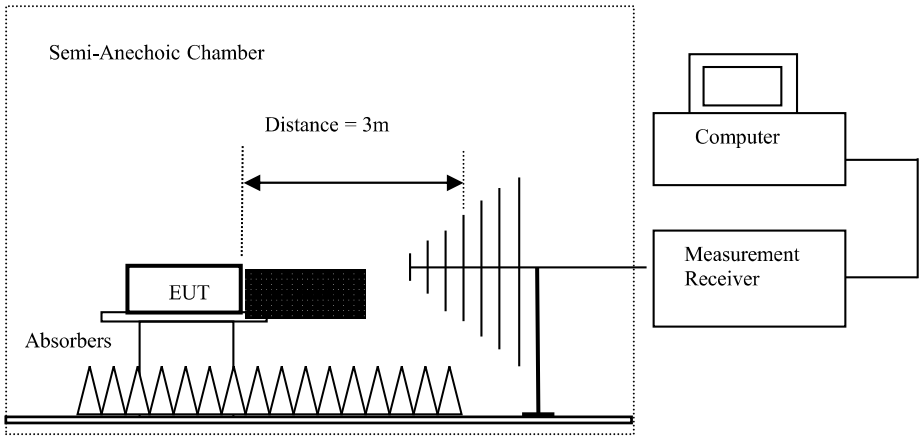
Remark: 3 orthogonal axis apply to hand-held device only.

*: 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.

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:



Ground Plane

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

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	Correction Factor	Field Strength	Field Strength	Limit @3m	E-Field Polarity
	MHz	dBµV/m	dBµV/m	dBµV/m	µV/m	µV/m	
	2411.2	80.1	27.8	107.9	248,313.3	500,000	Vertical
*	4820.3	19.0	32.3	51.3	367.3	5,000	Vertical
	7233.6	-3.8	37.2	33.4	46.8	5,000	Vertical
	9644.8					5,000	Vertical
*	12056.0					5,000	Vertical
	14467.2					5,000	Vertical
	16878.4	Emissions detected are more than				5,000	Vertical
*	19289.6	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	Correction Factor	Field Strength	Field Strength	Limit @3m	E-Field Polarity
	MHz	dBµV/m	dBµV/m	dBµV/m	µV/m	µV/m	
	2411.2	54.5	27.8	82.3	13,031.7	50,000	Vertical
*	4820.3	-1.9	32.3	30.4	33.1	500	Vertical
	7233.6	-7.1	37.2	30.1	32.0	500	Vertical
	9644.8					500	Vertical
*	12056.0					500	Vertical
	14467.2					500	Vertical
	16878.4	Emissions detected are more than				500	Vertical
*	19289.6	20 dB below the FCC Limits				500	Vertical
	21700.8					500	Vertical
	24112.0					500	Vertical

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	dBµV/m	dBµV/m	dBµV/m	µV/m	µV/m	
	2441.8	79.5	27.8	107.3	231,739.5	500,000	Vertical
*	4884.9	18.4	32.5	50.9	350.8	5,000	Vertical
*	7322.7	-2.7	37.5	34.8	55.0	5,000	Vertical
	9767.2					5,000	Vertical
*	12209.0					5,000	Vertical
	14650.8					5,000	Vertical
	17092.6	Emissions detected are more than				5,000	Vertical
*	19534.4	20 dB below the FCC Limits				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	dBµV/m	dBµV/m	dBµV/m	µV/m	µV/m	
	2441.8	53.6	27.8	81.4	11,749.0	50,000	Vertical
*	4884.9	-1.8	32.5	30.7	34.3	500	Vertical
*	7322.7	-6.2	37.5	31.3	36.7	500	Vertical
	9767.2					500	Vertical
*	12209.0					500	Vertical
	14650.8					500	Vertical
	17092.6	Emissions detected are more than				500	Vertical
*	19534.4	20 dB below the FCC Limits				500	Vertical
	21976.2					500	Vertical
	24418.0					500	Vertical

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	dBµV/m	dBµV/m	dBµV/m	µV/m	µV/m	
	2472.4	80.3	27.8	108.1	254,097.3	500,000	Vertical
*	4942.3	19.4	32.5	51.9	393.6	5,000	Vertical
*	7416.3	-2.7	37.8	35.1	56.9	5,000	Vertical
	9889.6					5,000	Vertical
*	12362.0					5,000	Vertical
	14834.4					5,000	Vertical
	17306.8	Emissions detected are more than				5,000	Vertical
*	19779.2	20 dB below the FCC Limits				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	dBµV/m	dBµV/m	dBµV/m	µV/m	µV/m	
	2472.4	55.3	27.8	83.1	14,288.9	50,000	Vertical
*	4942.3	-2.1	32.5	30.4	33.1	500	Vertical
*	7416.3	-5.2	37.8	32.6	42.7	500	Vertical
	9889.6					500	Vertical
*	12362.0					500	Vertical
	14834.4					500	Vertical
	17306.8	Emissions detected are more than				500	Vertical
*	19779.2	20 dB below the FCC Limits				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

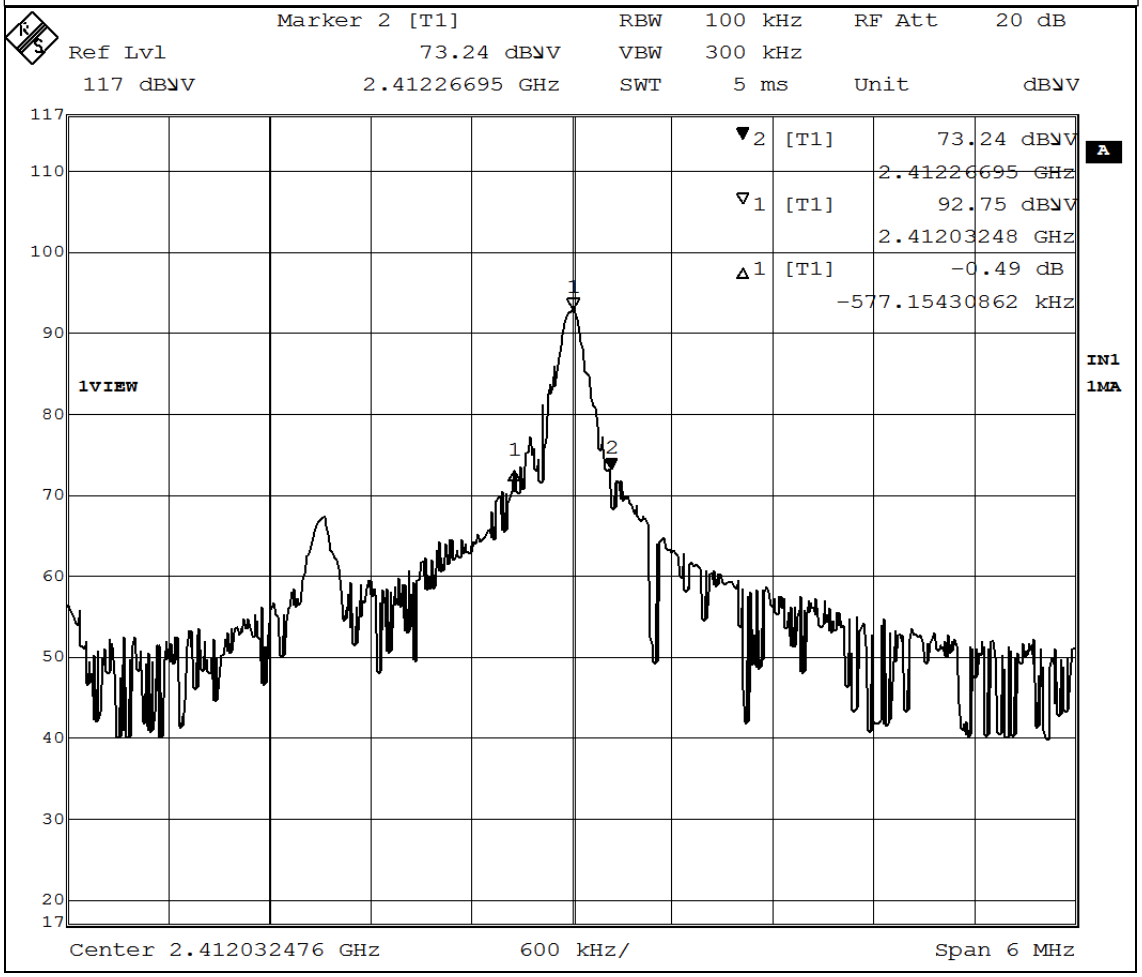
*: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

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

Limits for 20dB Bandwidth of Fundamental Emission:

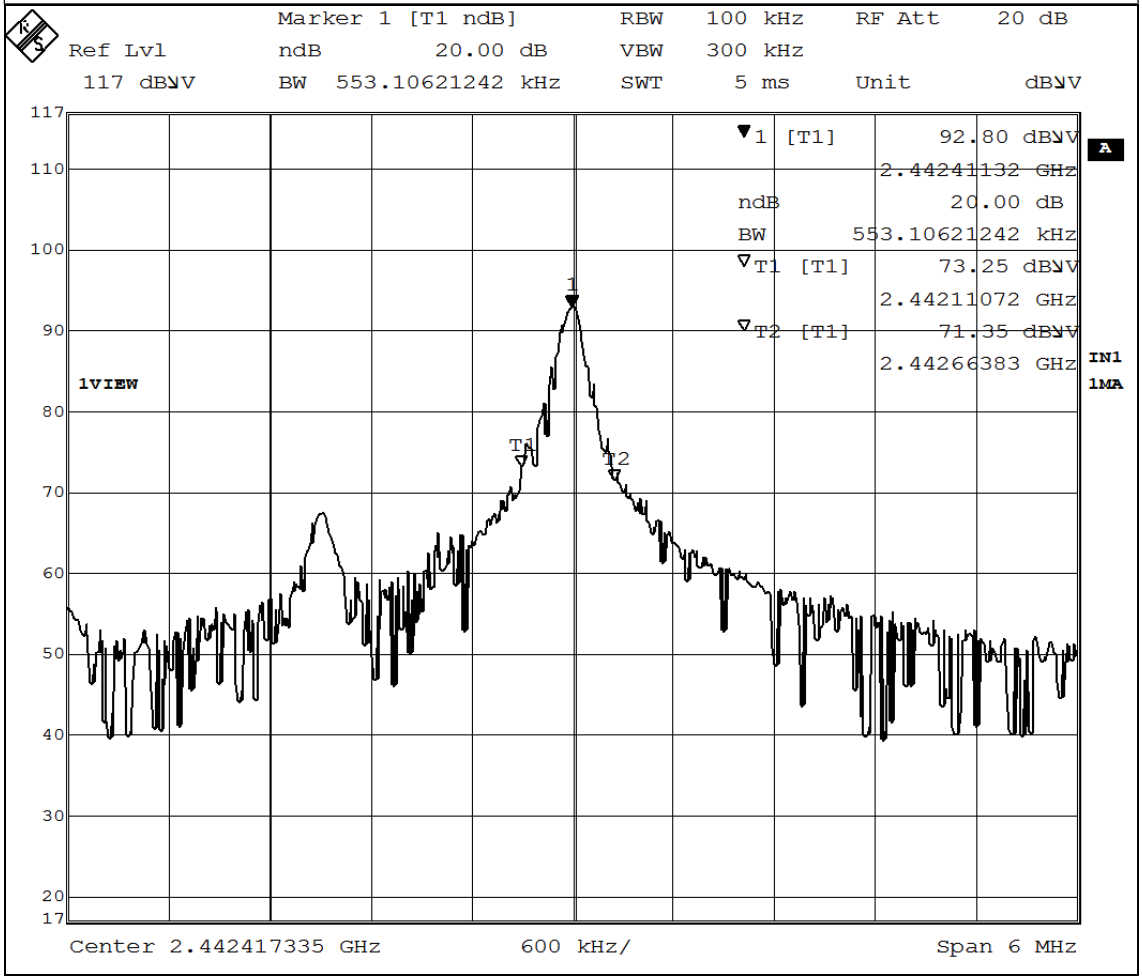
Frequency Range [MHz]	20dB Bandwidth [kHz]
2412.0	577.2

20dB Bandwidth of Fundamental Emission



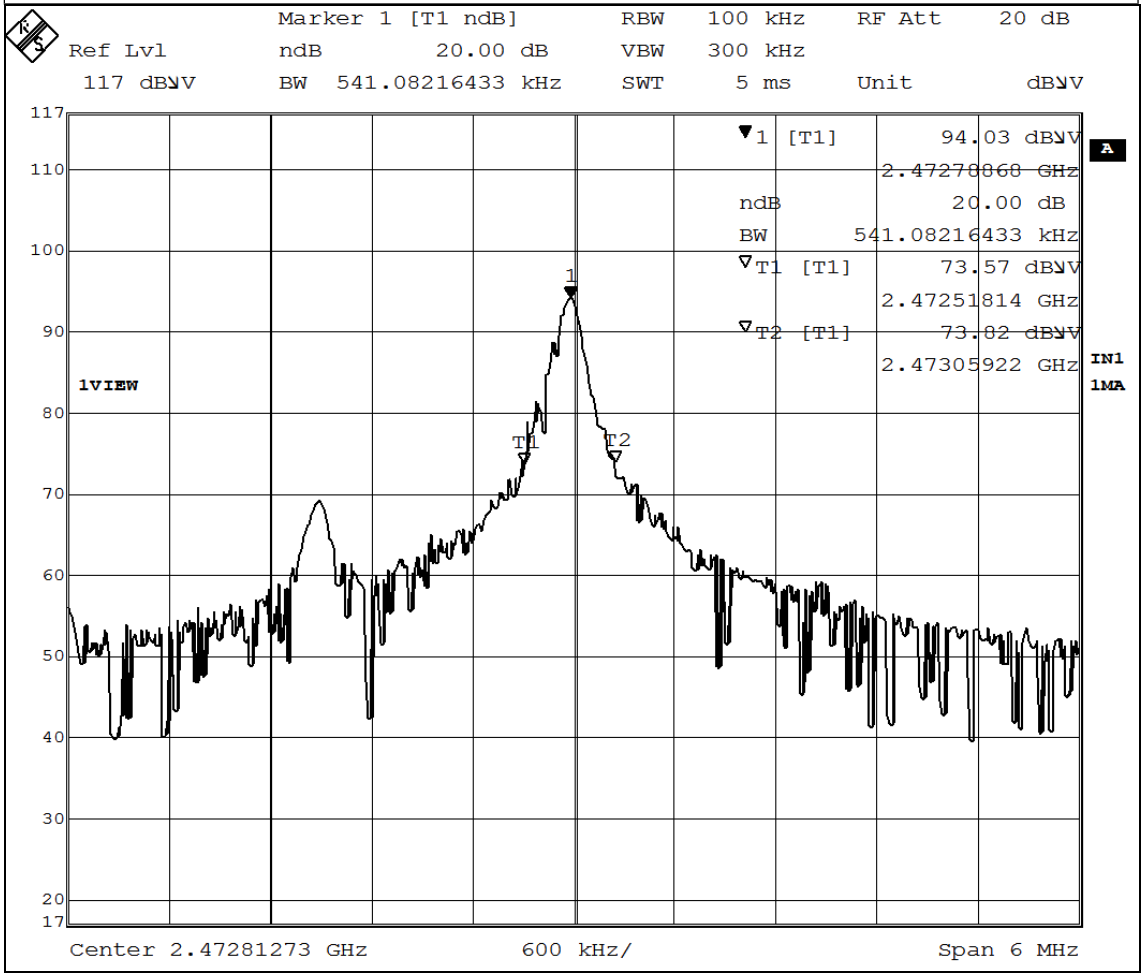
Frequency Range [MHz]	20dB Bandwidth [kHz]
2442.4	553.1

20dB Bandwidth of Fundamental Emission



Frequency Range [MHz]	20dB Bandwidth [kHz]
2472.8	541.1

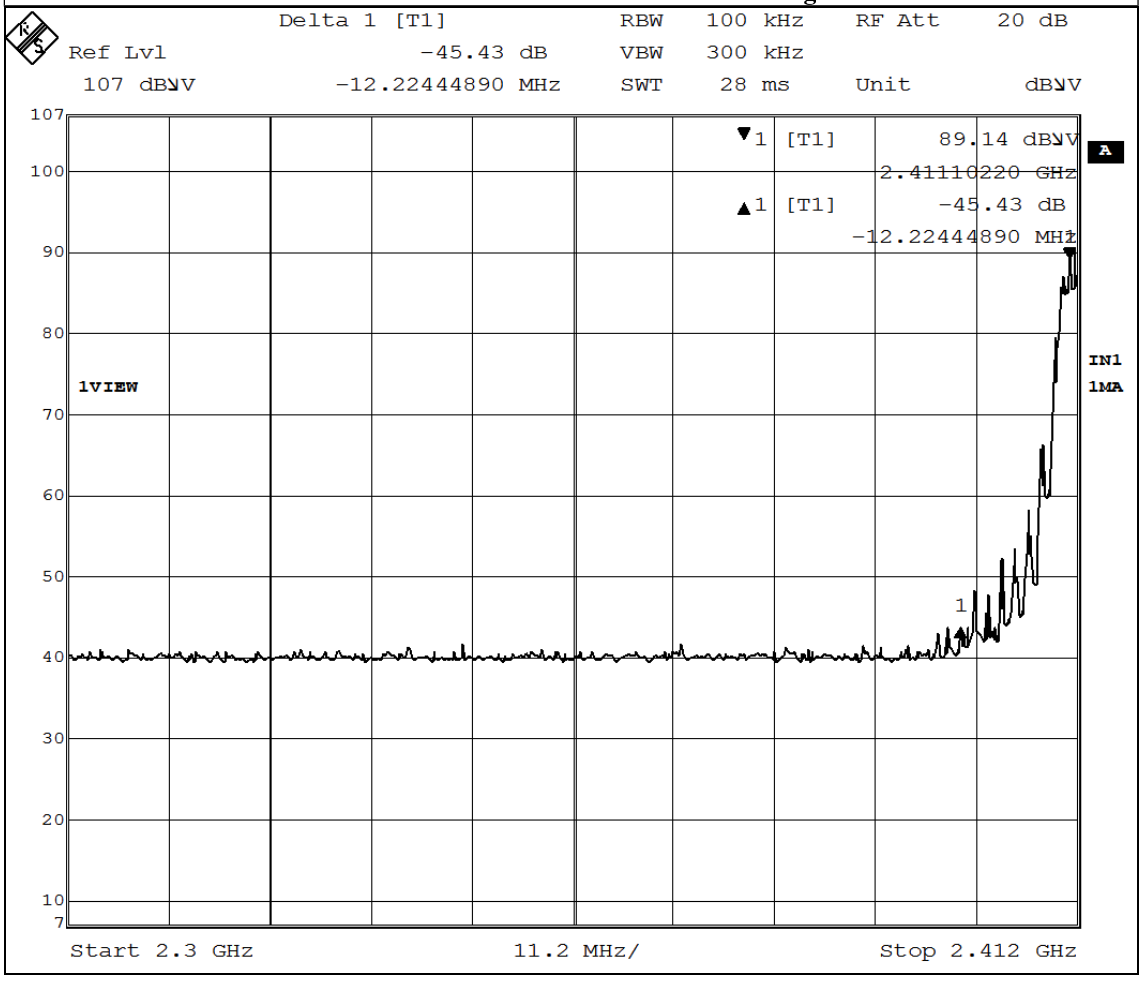
20dB Bandwidth of Fundamental Emission



Band Edge Measurement:

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
Lowest Fundamental	45.4

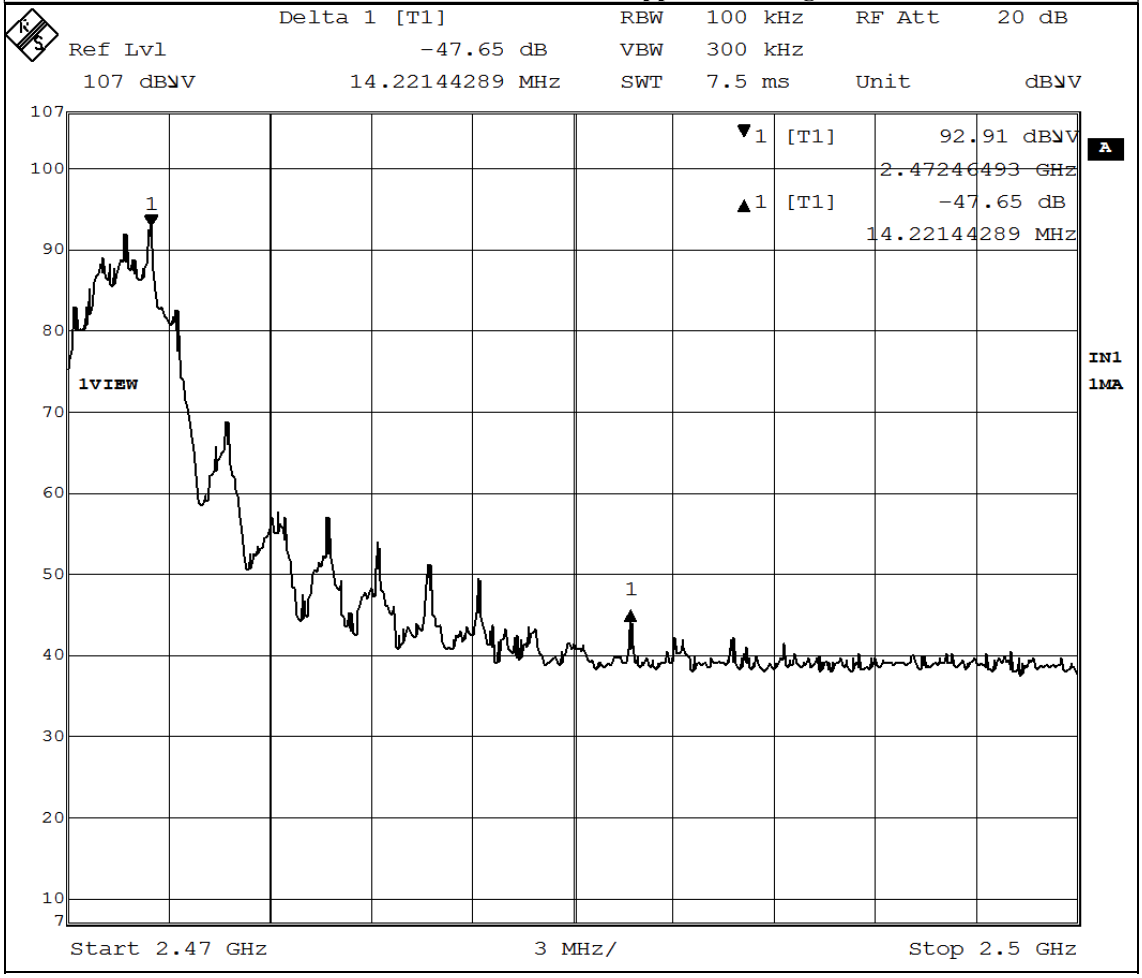
45.4dB Level Reduction at Lower Band Edge



Band Edge Measurement:

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
Highest Fundamental	47.7

47.7dB Level Reduction at Upper Band Edge



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

Frequency Range [MHz]	Quasi-Peak Limits [μV/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
Above960	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 MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
384.0	20.1	19.6	39.7	46.0	6.3	Horizontal
480.0	9.8	22.6	32.4	46.0	13.6	Horizontal
575.8	15.5	24.3	39.8	46.0	6.2	Vertical
767.8	18.5	27.3	45.8	46.0	0.2	Vertical
959.8	5.0	31.7	36.7	46.0	9.3	Vertical

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

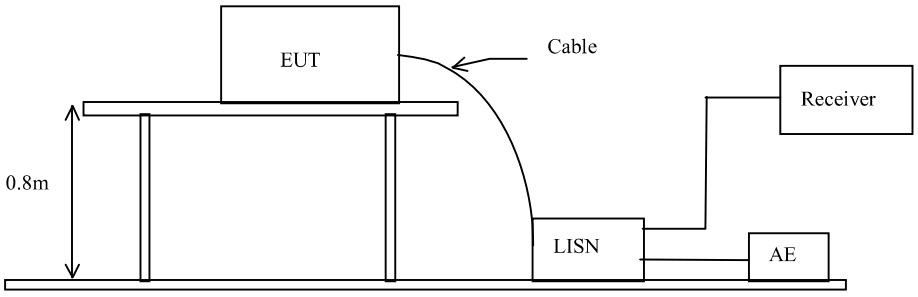
3.1.3 Conducted Emissions (0.15MHz to 30MHz)

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:	120Va.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:



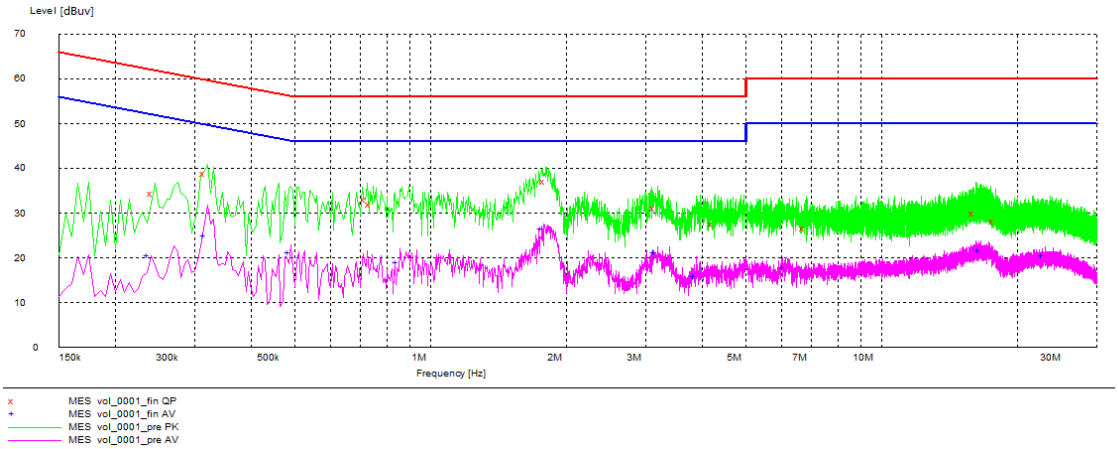
Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
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.

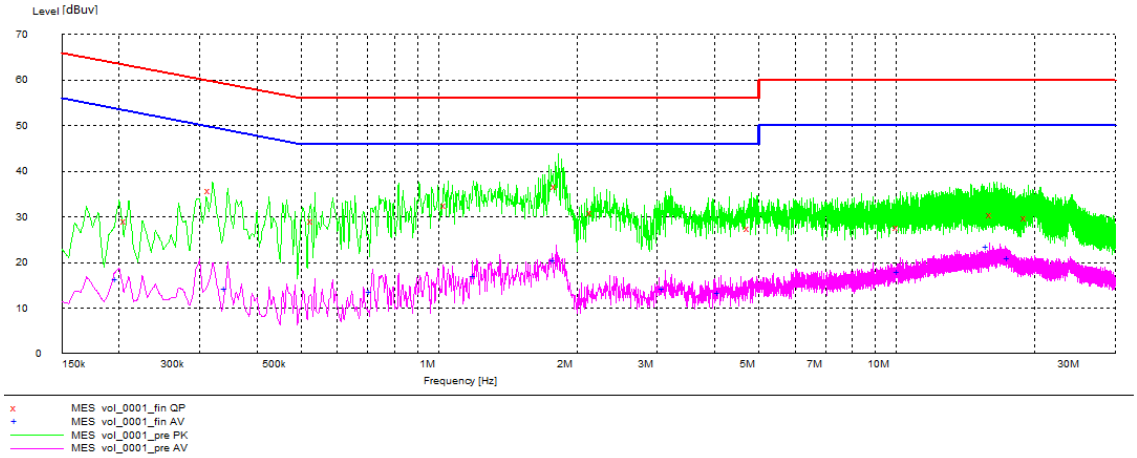
Results of Communication mode with charging function: PASS
Please refer to the following diagram for individual results.



Results of Communication mode with charging function - Live: PASS

Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dBµV	dBµV	dBµV	dBµV
Live	0.240	-*-	-*-	20.3	52.0
Live	0.245	34.3	62.0	-*-	-*-
Live	0.320	38.8	60.0	24.7	50.0
Live	0.490	-*-	-*-	21.1	46.0
Live	0.725	33.1	56.0	-*-	-*-
Live	0.745	32.0	56.0	-*-	-*-
Live	0.855	-*-	-*-	18.9	46.0
Live	1.785	-*-	-*-	26.3	46.0
Live	1.810	37.0	56.0	-*-	-*-
Live	3.180	31.1	56.0	21.0	46.0
Live	3.880	-*-	-*-	15.8	46.0
Live	4.285	27.5	56.0	-*-	-*-
Live	6.130	-*-	-*-	17.8	50.0
Live	6.820	26.6	60.0	-*-	-*-
Live	16.240	30.0	60.0	-*-	-*-
Live	16.630	-*-	-*-	21.5	50.0
Live	17.930	28.1	60.0	-*-	-*-
Live	22.995	-*-	-*-	20.3	50.0

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



Results of Communication mode with charging function - Neutral: PASS

Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dBµV	dBµV	dBµV	dBµV
Neutral	0.200	-*-	-*-	-*-	-*-
Neutral	0.210	29.0	63.0	-*-	-*-
Neutral	0.320	35.6	60.0	-*-	-*-
Neutral	0.345	-*-	-*-	14.0	49.0
Neutral	0.535	28.9	56.0	-*-	-*-
Neutral	0.715	-*-	-*-	13.3	46.0
Neutral	1.045	32.4	56.0	-*-	-*-
Neutral	1.210	-*-	-*-	16.9	46.0
Neutral	1.805	-*-	-*-	20.2	46.0
Neutral	1.825	36.6	56.0	-*-	-*-
Neutral	2.180	30.8	56.0	-*-	-*-
Neutral	3.120	-*-	-*-	14.0	46.0
Neutral	4.120	-*-	-*-	13.2	46.0
Neutral	4.810	27.5	56.0	-*-	-*-
Neutral	10.185	27.7	60.0	17.7	50.0
Neutral	16.000	-*-	-*-	23.2	50.0
Neutral	16.270	30.4	60.0	-*-	-*-
Neutral	17.735	-*-	-*-	20.8	50.0
Neutral	19.395	29.8	60.0	-*-	-*-

Remarks:
Calculated measurement uncertainty (0.15MHz – 30MHz): 3.2dB
-*- Emission(s) that is far below the corresponding limit line.

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