FCC EMI TEST REPORT

FCC ID	:	**U8G-P1021LTE**
Equipment	:	**PEPXIM / PEPWAVE / peplink Wireless Product**
Brand Name	:	**PEPXIM / PEPWAVE / peplink**
Model Name	:	**Refer section 1.1**
Applicant	:	**PACIFIC SMART SYSTEMS LIMITED A8, 5/F, HK Spinners Industrial Building, Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Hong Kong**
Manufacturer	:	**PACIFIC SMART SYSTEMS LIMITED A8, 5/F, HK Spinners Industrial Building, Phase 6, 481 Castle Peak Road, Cheung Sha Wan, Hong Kong**
Standard	:	**47 CFR FCC Rules and Regulations Part 15 Subpart B, Class A Digital Device ICES-003 Issue 6, Class A**

The product was received on May 13, 2019, and testing was started from Jun. 14, 2019 and completed on Jun. 15, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2014 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: William Li

SDoC by:

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FC951322	01	Initial issue of report	Jul. 01, 2019

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
4	15.107	Conducted Emissions of Powerline	PASS	Under limit 12.10 dB at 22.079 MHz
5.1	15.109	Radiated Emissions below 1GHz	PASS	Under limit 3.38 dB at 34.25 MHz
5.2	15.109	Radiated Emissions above 1GHz	PASS	Under limit 33.02 dB at 5.93 GHz

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and explanations:
None

Reviewed by: Andrew Yang

Report Producer: Ann Hou

1. General Description of Equipment under Test

1.1. Basic Description of Equipment under Test

Equipment	:	PEPXIM / PEPWAVE / peplink Wireless Product
Model Name	:	Power Management Unit LTE SD Power Management Unit (LTE) Software-Defined Power Management Unit (LTE) PMU-DD-LTE-US-52V-200W-T SD-PMU-LTE SD PMU LTE PMU-DD-LTE-US-T Pismo021 LTE MAX BR1 POWER MAX BR1 Power BR1 Power BR1 POWER SD PMU LTEA SD-PMU-LTEA
Power Supply Type	:	From Power Adapter
AC Power Cord	:	Non-Shielded, 1.4 m, 3 pin
DC Power Cable	:	Non-Shielded, 1.5 m

The maximum operating frequency : 4GHz

1.2. Feature of Equipment under Test

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.3. Modification of EUT

Please refer to the applicant solution information and photographs of EUT.

1.4. Table for Multiple Listing

The brand/model names in the following table are all refer to the identical product.

Brand Name	Model Name	Description
PEPXIM / PEPWAVE / peplink	Power Management Unit LTE	The difference model for difference brand served as marketing strategy.
	SD Power Management Unit (LTE)	
	Software-Defined Power Management Unit (LTE)	
	PMU-DD-LTE-US-52V-200W-T	
	SD-PMU-LTE	
	SD PMU LTE	
	PMU-DD-LTE-US-T	
	Pismo021 LTE	
	MAX BR1 POWER	
	MAX BR1 Power	
	BR1 Power	
	BR1 POWER	
	SD PMU LTEA	
	SD-PMU-LTEA	

Note: Only model name: SD Power Management Unit (LTE) configuration was measured during the test.

2. Test Configuration of Equipment under Test

2.1. Details of EUT Test Modes

The equipment under test were performed the following test modes:

Test Items	Description of test modes
Conducted Emission	Mode 1. LTE link(SIM slot A), GPS RX, WAN:100Mbps, LAN:100Mbps, Output(Front):52V, Output(Rear):52V, Adapter Mode Mode 2. LTE link(SIM slot B), GPS RX, WAN:100Mbps, LAN:100Mbps, Output(Front):52V, Output(Rear):52V, Adapter Mode Mode 3. WCDMA Link(SIM slot A), GPS RX, WAN:100Mbps, LAN:100Mbps, Output(front):52V, Output(Rear):52V, Adapter Mode Mode 4. LTE link(SIM slot A), GPS RX, WAN:100Mbps, LAN:100Mbps, Output(front):12V, Output(Rear):12V, Adapter Mode cause “mode 1” generated the worst test result; it was reported as final data.
Radiated Emissions <below 1GHz>	Mode 1. LTE link(SIM slot A), GPS RX, WAN:100Mbps, LAN:100Mbps, Output(Front):52V, Output(Rear):52V, Adapter Mode Mode 2. LTE link(SIM slot B), GPS RX, WAN:100Mbps, LAN:100Mbps, Output(Front):52V, Output(Rear):52V, Adapter Mode Mode 3. WCDMA Link(SIM slot A), GPS RX, WAN:100Mbps, LAN:100Mbps, Output(front):52V, Output(Rear):52V, DC IN 56V Mode 4. LTE link(SIM slot A), GPS RX, WAN:100Mbps, LAN:100Mbps, Output(front):12V, Output(Rear):12V, DC IN 12V cause “mode 1” generated the worst test result; it was reported as final data.
Radiated Emissions <above 1GHz>	Mode 1. LTE link(SIM slot A), GPS RX, WAN:100Mbps, LAN:100Mbps, Output(Front):52V, Output(Rear):52V, Adapter Mode

2.2. Description of Test System

Conducted emission and radiated emission below 1GHz

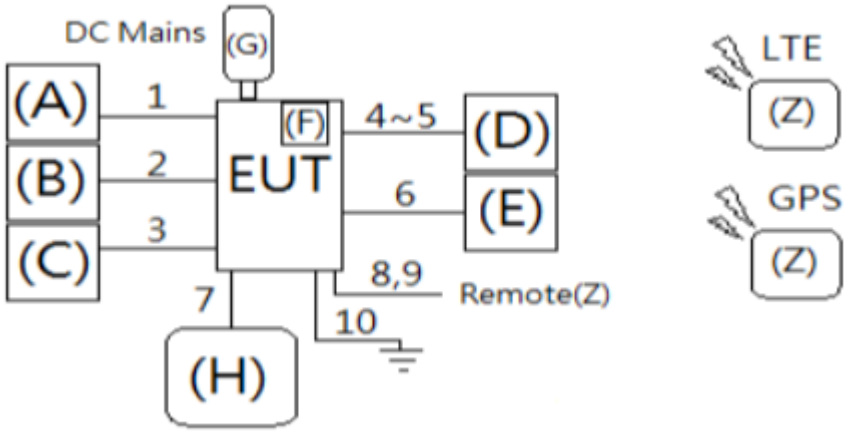
No.	Peripheral	Manufacturer	Model Number	FCC ID	Remarks
For Local					
A	Adapter	TECH	STD-56021	DoC	Client provided
B	SD--PMU-LTE	PEPXIM	SD-PMU-LTE	N/A	Client provided
C	PEPWAVE MAX cellular router	PEPWAVE	MAX-HD4-MBX-LTEA-W	N/A	Client provided
D	Dummy Load	N/A	N/A	N/A	-
E	Battery	YUASA	NP7-12	N/A	-
F	SIM Card	R&S	N/A	N/A	-
G	Dipole Antenna*2	N/A	N/A	N/A	EUT
H	GPS Antenna	N/A	N/A	N/A	EUT
For Remote					
Z	Notebook	DELL	E5430	DoC	-
Z	Wireless AP	ASUS	RT-AC66U	MSQ-RTAC66U	-
Z	GPS Simulator	pendulum	GSG-54	N/A	-
Z	Communication Analyzers	R & S	CMW500	N/A	-

Radiated emission above 1GHz

No.	Peripheral	Manufacturer	Model Number	FCC ID	Remarks
For Local					
A	Adapter	TECH	STD-56021	DoC	Client provided
B	Dipole Antenna*2	N/A	N/A	N/A	EUT
C	GPS Antenna	N/A	N/A	N/A	EUT
D	SD--PMU-LTE	PEPXIM	SD-PMU-LTE	N/A	Client provided
E	PEPWAVE MAX cellular router	PEPWAVE	MAX-HD4-MBX-LTEA-W	N/A	Client provided
F	Dummy Load	N/A	N/A	N/A	-
G	Battery	YUASA	NP7-12	N/A	-
H	SIM Card	R&S	N/A	N/A	-
For Remote					
Z	Communication Analyzers	R & S	CMW500	N/A	-
Z	Notebook	DELL	E5430	DoC	-
Z	Wireless AP	ASUS	RT-AC66U	MSQ-RTAC66U	-
Z	GPS Simulator	pendulum	GSG-54	N/A	-

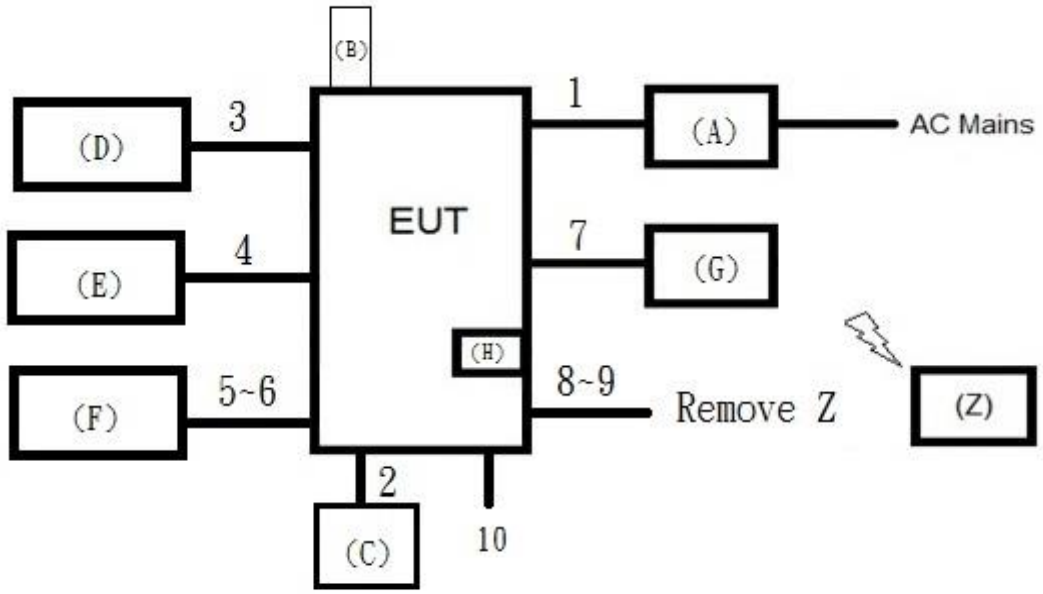
2.3. Connection Diagram of Test System

Test Setup Diagram
(Conducted emission and radiated emission below 1GHz)



No.	Types of Cables	Shielding on Cable	Length (m)	Remarks
1	DC Power Cable	Non-Shielded	1.5	With core
2	DC Cable	Non-Shielded	1	With core
3	DC Cable	Non-Shielded	1.7	With core
4	RJ 45 Cable	Non-Shielded	1	-
5	RJ 45 Cable	Non-Shielded	1	-
6	DC Cable	Non-Shielded	1	-
7	GPS Cable	Non-Shielded	5	-
8	LAN Cable	Non-Shielded	20	-
9	LAN Cable	Non-Shielded	20	-
10	GND Cable	Non-Shielded	2	-

Test Setup Diagram
(Radiated emission above 1GHz)



No.	Types of Cables	Shielding on Cable	Length (m)	Remarks
1	DC Power Cable	Non-Shielded	1.5	With core
2	GPS Cable	Non-Shielded	5	-
3	DC Cable	Non-Shielded	1	With core
4	DC Cable	Non-Shielded	1.7	With core
5	RJ45 Cable	Non-Shielded	1	-
6	RJ45 Cable	Non-Shielded	1	-
7	DC Cable	Non-Shielded	1	-
8	LAN Cable	Non-Shielded	10	-
9	LAN Cable	Non-Shielded	10	-
10	GND Cable	Non-Shielded	2	-

2.4. Test Manner

An executive program, “EMIprogram.exe” under WIN 7 was used as the test software. The program was executed as follows:

- The remote notebook executed "ping.exe” to link with the EUT (LAN Port 4) to maintain the connection by RJ45 cable.
- The EUT (WAN/LAN Port 1) link with internet by RJ45 cable and remote AP.
- The EUT (LAN Port 2~Port 3) link with 100 ohm Dummy Load by RJ45 cable.
- The remote notebook executed "putty” to link with the remote workstation (GPS Simulator) to maintain the connection by GPS function.
- The EUT link with the remote base station to maintain the connection by SIM Card.
- The EUT (Ignition Pin Port) link with load (12V Battery).
- Output (Front/Rear) : The DC output is connected to the input of another device

3. General Information of Test

3.1. Test Facilities

Test Site：SPORTON INTERNATIONAL INC.			
☒	HUA YA	ADD :	No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)
		TEL :	886-3-327-3456 FAX : 886-3-318-0055
☐	DONG HU	ADD :	No. 3, Ln. 238, Kangle St., Neihu Dist., Taipei City, Taiwan (R.O.C.)
		TEL :	886-2-2631-5551 FAX : 886-2-2631-9740
☐	LIN KOU	ADD :	No. 30-2, Dingfu Vil., Linkou Dist., New Taipei City, Taiwan (R.O.C.)
		TEL :	886-2-2601-1640 FAX : 886-2-2601-1695

Test Items	Test Site No.	Test Engineer	Test Environment		Test Date	Remark
			temp °C	hum %		
Conducted Emissions of Powerline	CO04-HY	Scott	21.6~22	63~64	14/Jun/2019	-
Radiated Emissions below 1GHz	10CH01-HY	Nigel	24.5~25	60~62	15/Jun/2019	-
Radiated Emissions above 1GHz	03CH04-HY	Alan	26.5~26.7	55~56	14/Jun/2019	-

3.2. Test Standards

Test items	Test Standards and Test Procedures
Radiated and Conducted Emissions	ANSI C63.4:2014 with FCC Method 47 CFR Part 15, Subpart B, Class A Digital Device, Canada Standard ICES-003 Issue 6, Class A

3.3. Test Voltage/Frequencies

Power Supply Type	Voltage/Frequencies
Power Adapter	I/P: 120V / 60Hz
	O/P: DC 56V

3.4. Test Distance and Frequency Range Investigated

Test Items	Frequency Range	Remark
Powerline Conducted Emissions	150 kHz to 30 MHz	-
Radiated Emissions (below 1GHz)	30 MHz to 1,000 MHz	Measurement distance is 10 m.
Radiated Emissions (above 1GHz)	1,000 MHz to 18,000 MHz	Measurement distance is 3 m.
	18,000 MHz to 20,000 MHz	Measurement distance is 1 m.

3.5. Operating Condition

- Full system.

3.6. Labelling requirements

3.6.1. FCC Labelling requirements

The devices shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

3.6.2. ICES Labelling requirements

The manufacturer, importer or supplier shall meet the labelling requirements set out in this section and in Notice 2014-DRS1003 for electronic labelling for every unit:

(i) prior to marketing in Canada, for ITE manufactured in Canada and
(ii) prior to importation into Canada, for imported ITE.

Each unit of an ITE model shall bear a label (see below) that represents the manufacturer's or the importer's SDoC with Innovation, Science and Economic Development Canada's ICES-003. This label shall be permanently affixed to the ITE or displayed electronically and its text must be clearly legible. If the dimensions of the device are too small or if it is not practical to place the label on the ITE and electronic labelling has not been implemented, the label shall be, upon agreement with Innovation, Science and Economic Development Canada, placed in a prominent location in the user manual supplied with the ITE. The user manual may be in an electronic format and must be readily available.

Innovation, Science and Economic Development Canada ICES-003 Compliance Label:
CAN ICES-3 (*)/NMB-3(*)
* Insert either "A" or "B" but not both to identify the applicable Class of ITE.

3.7. User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

4. Conducted Emissions Measurement

Conducted Emissions were measured according to the methods defined in ANSI C63.4-2014 Section 7.
The EUT is which satisfies the Class A disturbance limits.

4.1. Limit

Limits for conducted disturbance at the mains ports of class A			
Frequency range MHz	**Coupling device**	**Detector type / bandwidth**	**Class A limits** dB(μV)
0,15 – 0,5	AMN	Quasi-peak / 9 kHz	79
0,50 – 30			73
0,15 – 0,5	AMN	Average / 9 kHz	66
0,50 – 30			60
Note 1: The lower limit shall apply at the transition frequency.			

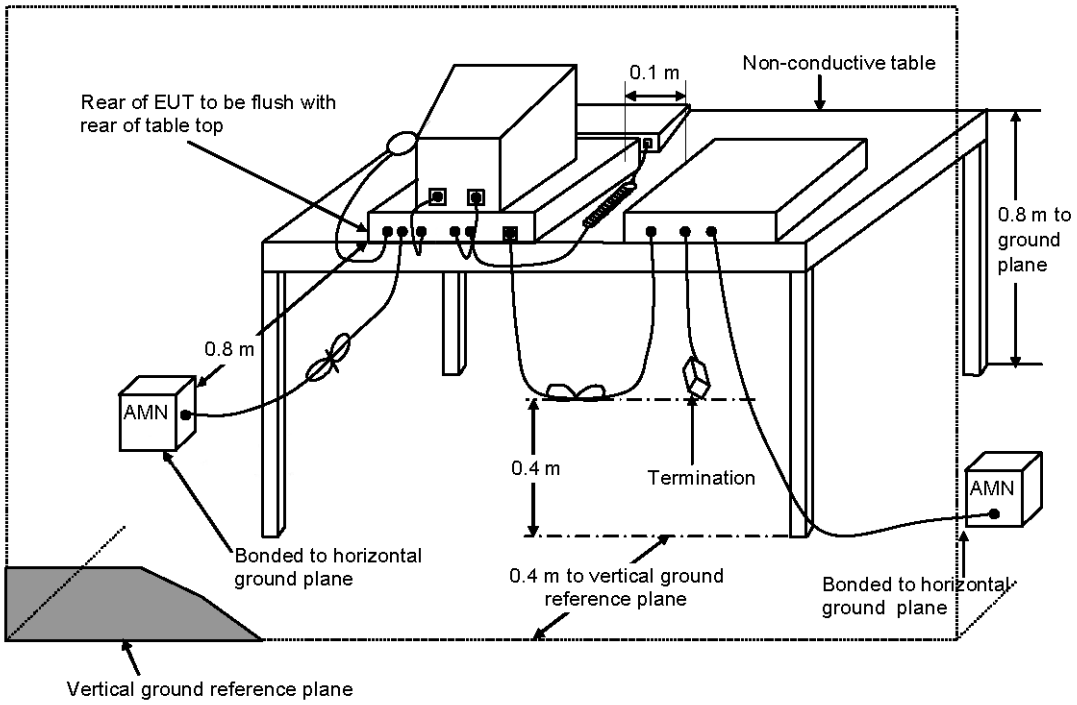
4.2. Test Procedures

a). The EUT was warmed up for 15 minutes before testing started.
b). The EUT was placed on a desk 0.8 meter height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meter from any other grounded conducting surface.
c). Connect EUT to the power mains through a line impedance stabilization network (LISN).
d). All the support units are connect to the other LISN.
e). The LISN provides 50 ohm, coupling impedance for the measuring instrument.
f). The CISPR states that a 50 ohm, 50 microhenry LISN should be used.
g). Both sides of AC line were checked for maximum conducted interference.
h). The frequency range from 150 kHz to 30 MHz was searched.
i). Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
j). All emissions not reported here are more than 10 dB below the prescribed limit.

4.3. Measurement Results Calculation

The measurand Level is calculated using:
Corrected Reading (dBμV) = Raw(Read Level)+(LISN Factor)+CL(Cable Loss)+AT(Attenuator)
For example at 0.3 MHz if the LISN Factor is 10.48 dB, the cable loss is 0.10 dB, the measured voltage is 36.39 dBμV, attenuation 10dB, the signal strength would be calculated:
Corrected Reading (dBμV) = 36.39 dBμV+10.48 dB + 0.10 dB + 10 dB = 56.97 dBμV

4.4. Typical Test Setup Layout



a). AMN is 80 cm from the EUT and at least 80 cm from other units and other metal planes.
b). EUT is connected to one artificial mains network (AMN).
c). All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
d). Rear of EUT to be flushed with rear of table top.
e). Peripherals shall be placed at a distance of 10 cm from each other and from the controller, except for the monitor which, if this is an acceptable installation practice, shall be placed directly on the top of the controller.
f). If cables, which hang closer than 40 cm to the horizontal metal ground plane, cannot be shortened to appropriate length, the excess shall be folded back and forth forming a bundle 30 cm to 40 cm long.
g). Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.
h). Cables of hand operated devices, such as keyboards, mice, etc. shall be placed as for normal usage.

4.5. Test Result

Refer as Appendix A

5. Radiated Emissions Measurement

Radiated Emissions were measured according to the methods defined in ANSI C63.4-2014 Section 8.
The EUT is which satisfies the Class A disturbance limits.

5.1. Radiated Emission below 1GHz

5.1.1. Limit

radiated emissions at frequencies up to 1 GHz for Class A equipment			
Frequency range MHz	**Measurement**		**Class A limits**
	Distance (m)	**Detector type / bandwidth**	**dB(μV/m)**
30 – 88	10	Quasi Peak / 120 kHz	39
88-216			43.5
216-960			46.4
Above 960			49.5

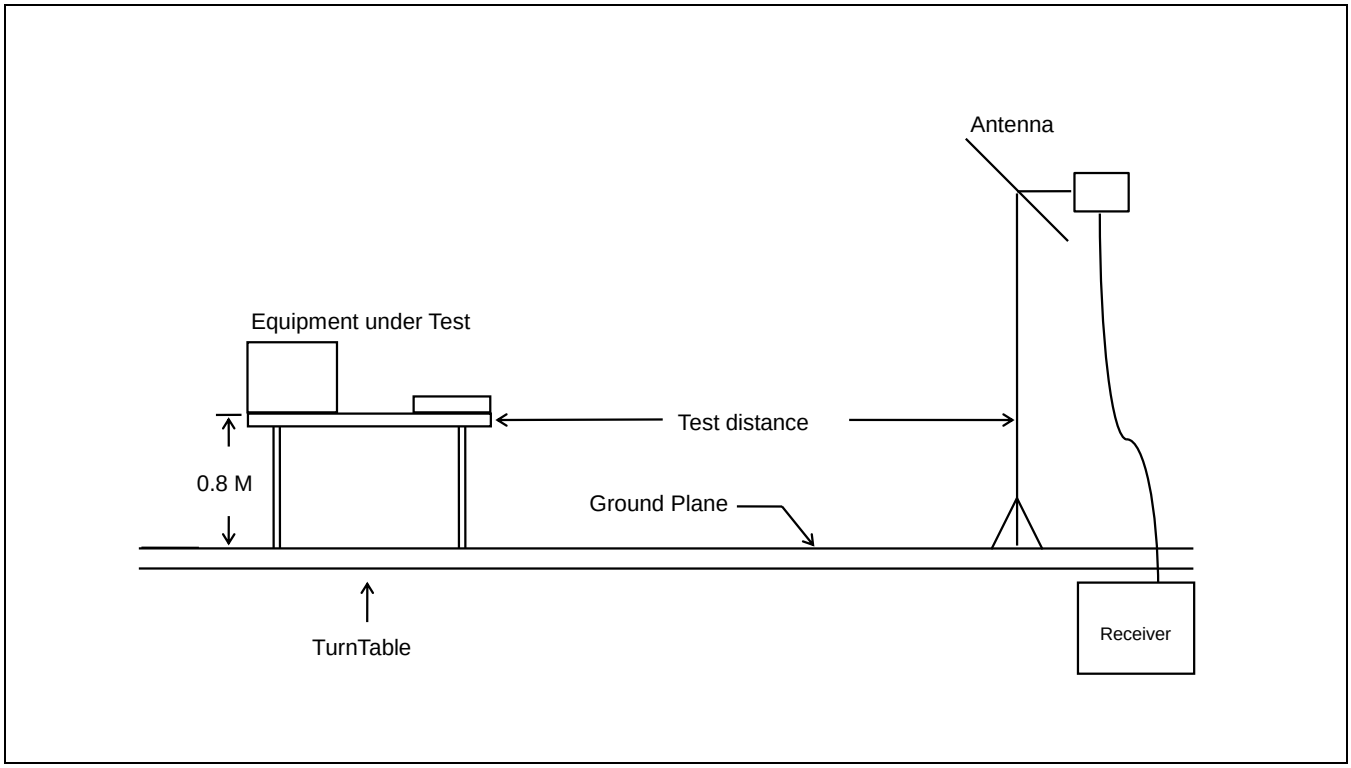
5.1.2. Test Procedures

a). The EUT was placed on a rotatable table top 0.8 meter above ground.
b). The EUT was set 10 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
c). The table was rotated 360 degrees to determine the position of the highest radiation.
d). The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
e). For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
f). Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
g). If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
h). The FCC Part 15.109(g) permit parties seeking to authorize a digital device to choose to demonstrate that the device complies with either the Part 15 standards or the international standards found in Publication 22 of the International Special Committee on Radio Interference (CISPR).

5.1.3. Measurement Results Calculation

The measurand Level is calculated using:
Corrected Reading (dBμV/m) = Raw(Read Level)+AF(Antenna Factor)+CL(Cable Loss)−PA(Preamp Factor)
For example at 125 MHz if the Antenna Factor is 17.24 dB/m, the cable loss is 1.20 dB, the measured voltage is 35.80
dBμV and the Preamp Factor is 27.18 dB, the signal strength would be calculated:
Corrected Reading (dBμV/m) = 35.80 dBμV + 17.24 dB/m + 1.20 dB - 27.18 dB = 27.06 dBμV/m
Note: If a hybrid antenna is used, the antenna factor shell be the sum of the Antenna Factor + Attenuator Factor.

5.1.4. Typical Test Setup Layout



5.1.5. Test Result

Refer as Appendix B

5.2. Radiated Emission above 1GHz

5.2.1. Limit

radiated emissions at frequencies above 1 GHz for Class A equipment			
Frequency range GHz	**Measurement**		**Class A limits**
	Distance (m)	**Detector type / RBW / VBW**	**dB(μV/m)**
1 – 18	3	Average / 1MHz / 1Hz	60
1 – 18		Peak / 1MHz / 3MHz	80
18 – 20	1	Average / 1MHz / 1Hz	69.54
18 – 20		Peak / 1MHz / 3MHz	89.54
Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).			
Remark: It should be noted that the field strength is inversely proportional to distance, so the field strength at 3m is 1/3 the strength at 1m, i.e. L3m/Lx = X/3. Ex. L3m dB-Lx dB = 20log(3/x); L1m dB = 60 + 20log (3/1) = 69.54 dB(μV/m)			

Required highest frequency for radiated measurement	
Highest internal frequency (F_x)	**Highest measured frequency**
$F_x \leq 108$ MHz	1 GHz
108 MHz < $F_x \leq 500$ MHz	2 GHz
500 MHz < $F_x \leq 1$ GHz	5 GHz
$F_x > 1$ GHz	5 x F_x up to a maximum of 40 GHz

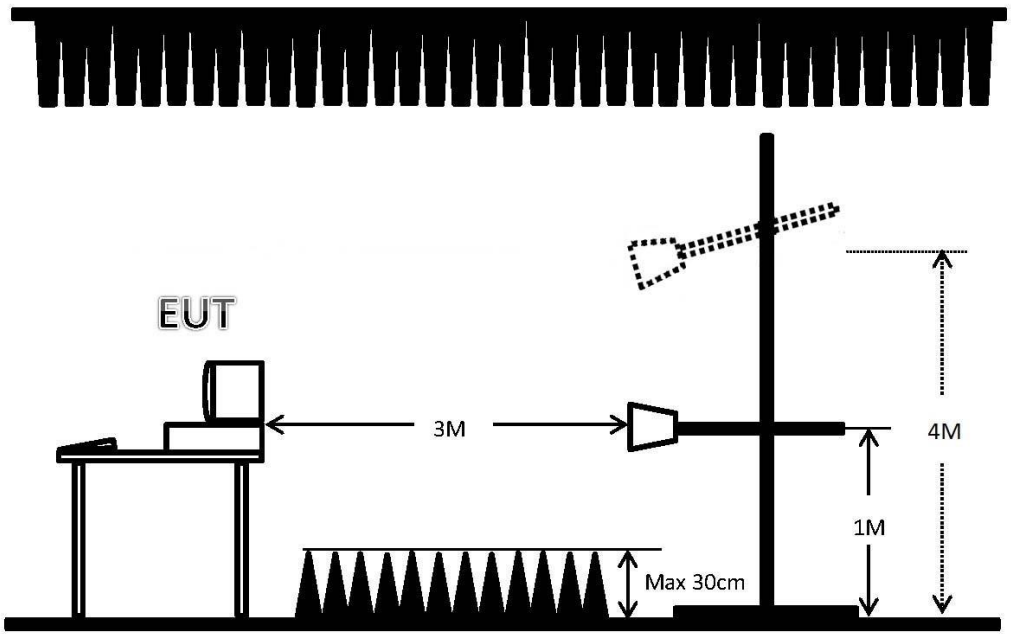
5.2.2. Test Procedures

a). Same test set up as below 1GHz radiated testing.
b). The EUT was set 3m (1 – 18GHz) / 1m (18 – 20GHz) from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
c). There should be absorber placed between the EUT and Antenna and its located size should let the test site meet CISPR16-1-4 requirement.
d). The table was rotated 360 degrees to determine the position of the highest radiation.
e). The measured using a test-receiver system with both a peak and CISPR average detector.
f). If the EUT is having a Wireless or Bluetooth modular, install the filter at the input connector of test-receiver system.
g). Set the DRG Horn Antenna at 1M height, then run the turn table to get the maximum noise reading from Horizontal and Vertical polarity separately.t the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
h). When EUT locating on the turn-table, and its height is over 172cm (Antenna's 3dB beam width of 6GHz is 27∘), the DRG Horn Antenna must be raised up and descended down, then turning around the turn-table to get the maximum noise reading of the Horizontal and Vertical polarity separately. Note the maximum raise up height is same as the top of EUT.
i). If emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

5.2.3. Measurement Results Calculation

The measurand Level is calculated using:
Corrected Reading (dBμV/m) = Raw(Read Level)+AF(Antenna Factor)+CL(Cable Loss)-PA(Preamp Factor)
For example at 1980 MHz if the Antenna Factor is 26.19 dB/m, the cable loss is 4.08 dB, the measured voltage is 51.30
dBμV and the Preamp Factor is 33.34 dB, the signal strength would be calculated:
Corrected Reading (dBμV/m) = 51.30 dBμV + 26.19 dB/m + 4.08 dB + - 33.34 dB = 48.23 dBμV/m

5.2.4. Typical Test Setup Layout



5.2.5. Test Result

Refer as Appendix C

6. Uncertainty of Test Site

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2).

6.1. Emission Test Measurement Uncertainty

Test Items	Test Site No.	U_{LAB}
Conducted Emissions	CO04-HY	1.95dB
Radiated Emissions below 1GHz	10CH01-HY	4.72dB
Radiated Emissions above 1GHz	03CH04-HY	6.47dB

7. List of Measuring Equipment Used

Conducted Emission - Test Date: 14/Jun/2019

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Test Receiver	R&S	ESR3	102051	9KHz ~ 3.6GHz	28/May/2019	27/May/2020	Conduction (CO04-HY)
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	08/Nov/2018	07/Nov/2019	Conduction (CO04-HY)
RF Cable-CON	MTJ	RG142	CB002-CO	9kHz ~ 200MHz	17/Sep/2018	16/Sep/2019	Conduction (CO04-HY)
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9 kHz ~ 30 MHz	11/Oct/2018	10/Oct/2019	Conduction (CO04-HY)
Software	Sporton	SENSE-EMI	V5.10.2	-	NCR	NCR	Conduction (CO04-HY)

NCR: No Calibration Request.

Radiated Emission below 1GHz - Test Date: 15/Jun/2019

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
N.S.A. Measurement	SIDT FRANKONIA	SAC-10M	10CH01-HY	30MHz ~ 1GHz	21/Apr/2019	20/Apr/2020	Radiation (10CH01-HY)
Spectrum Analyzer	R&S	FSP7	838858/013	9kHz ~ 7GHz	03/Apr/2019	02/Apr/2020	Radiation (10CH01-HY)
Amplifier	EM Electronics	EM101	60708	10MHz ~ 1GHz	12/Dec/2018	11/Dec/2019	Radiation (10CH01-HY)
Amplifier	Agilent	8447D	2944A10826	100kHz ~ 1.3GHz	09/Apr/2019	08/Apr/2020	Radiation (10CH01-HY)
Receiver	KEYSIGHT	N9038A	MY54130031	20Hz ~ 8.4GHz	06/Nov/2018	05/Nov/2019	Radiation (10CH01-HY)
Biconical Antenna	Schwarz beck	VHBB 9124	286	30MHz ~ 200MHz	14/May/2019	13/May/2020	Radiation (10CH01-HY)
Log Antenna	Schwarz beck	VUSLP 9111	206	200MHz ~ 1GHz	14/May/2019	13/May/2020	Radiation (10CH01-HY)
Turn Table	HD	DT 60 RPS	1513/004/00	0 ~ 360 degree	NCR	NCR	Radiation (10CH01-HY)
Antenna Mast	HD	MA240	240/100/686	1 ~ 4 m	NCR	NCR	Radiation (10CH01-HY)
Antenna Mast	Chaintek	EM-1000	60811	1 ~ 4 m	NCR	NCR	Radiation (10CH01-HY)
RF Cable 13m & 5m	Suhner Switzerland + Rosenberger	RG8/U	CB023-INSIDE	30MHz ~ 1GHz	08/Nov/2018	07/Nov/2019	Radiation (10CH01-HY)
RF Cable-R10m	Suhner Switzerland + Rosenberger	RG223/U + UAA220A-0	CB022-DOOR	30MHz ~ 1GHz	08/Nov/2018	07/Nov/2019	Radiation (10CH01-HY)
Software	Sporton	SENSE-EMI	V5.10.2	-	NCR	NCR	Radiation (10CH01-HY)

NCR: No Calibration Request.

Radiated Emission above 1GHz - Test Date: 14/Jun/2019

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Turn Table	Chaintek	3000	MF7802056	0 ~ 360 degree	NCR	NCR	Radiation (03CH04-HY)
Antenna Mast	MF	MF-7802	MF780208163	1 m ~ 4 m	NCR	NCR	Radiation (03CH04-HY)
3m Semi Anechoic Chamber (Site V.S.W.R)	RIKEN	3m SAC	03CH04-HY	1 GHz ~ 18 GHz 3m	09/Mar/2019	08/Mar/2020	Radiation (03CH04-HY)
Spectrum Analyzer	R&S	FSP 40	100004	9KHz ~ 40GHz	15/Aug/2018	14/Aug/2019	Radiation (03CH04-HY)
Microwave Preamplifier	Agilent	8449B	3008A02364	1GHz ~ 26.5GHz	13/Dec/2018	12/Dec/2019	Radiation (03CH04-HY)
Horn Antenna	SCHWARZBECK	BBHA9120	BBHA 9120 D-1130	1 GHz ~ 18 GHz	26/Oct/2018	25/Oct/2019	Radiation (03CH04-HY)
Broadband Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170339	18GHz ~ 40GHz	19/Apr/2019	18/Apr/2020	Radiation (03CH04-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 104	SN805197/4+MY39497	1 GHz ~ 26 GHz	13/Mar/2019	12/Mar/2020	Radiation (03CH04-HY)
Software	Sporton	SENSE-EMI	V5.10.2	-	NCR	NCR	Radiation (03CH04-HY)

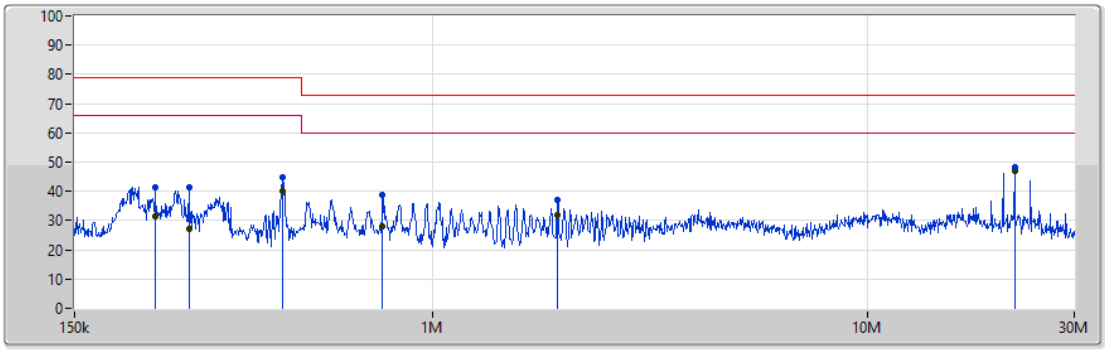
NCR: No Calibration Request.

Summary

Mode	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition
Mode 1	AV	22.079M	47.90	60.00	-12.10	19.69	Neutral

Mode 1

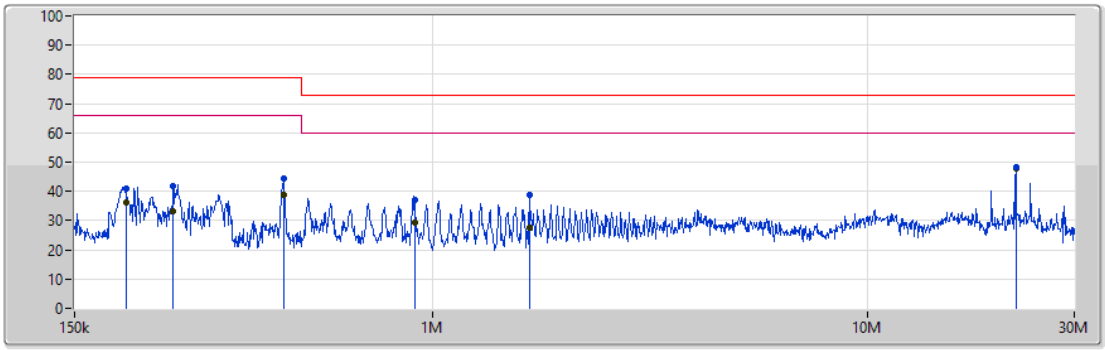
14/06/2019



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	229.659k	41.52	79.00	-37.48	19.48	Line	-	22.04	9.60	0.01	9.87
AV	229.659k	31.29	66.00	-34.71	19.48	Line	-	11.81	9.60	0.01	9.87
QP	276.192k	41.39	79.00	-37.61	19.48	Line	-	21.91	9.60	0.01	9.87
AV	276.192k	27.08	66.00	-38.92	19.48	Line	-	7.60	9.60	0.01	9.87
QP	450.942k	44.86	79.00	-34.14	19.48	Line	-	25.38	9.59	0.01	9.88
AV	450.942k	40.06	66.00	-25.94	19.48	Line	-	20.58	9.59	0.01	9.88
QP	766.96k	38.72	73.00	-34.28	19.50	Line	-	19.22	9.60	0.02	9.88
AV	766.96k	27.88	60.00	-32.12	19.50	Line	-	8.38	9.60	0.02	9.88
QP	1.944M	37.10	73.00	-35.90	19.54	Line	-	17.56	9.62	0.03	9.89
AV	1.944M	31.70	60.00	-28.30	19.54	Line	-	12.16	9.62	0.03	9.89
QP	21.865M	48.30	73.00	-24.70	19.62	Line	-	28.68	9.61	0.11	9.90
AV	21.865M	46.90	60.00	-13.10	19.62	Line	"Worst"	27.28	9.61	0.11	9.90

Mode 1

14/06/2019



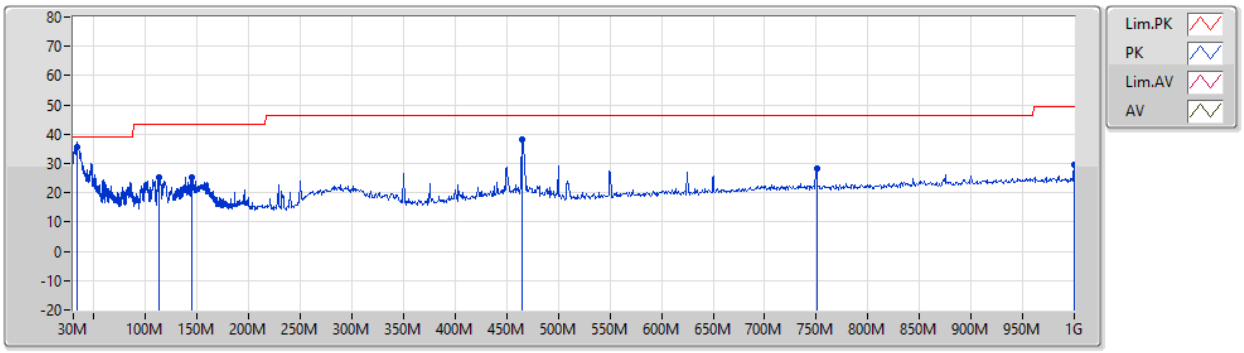
Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	197.282k	40.91	79.00	-38.09	19.47	Neutral	-	21.44	9.59	0.01	9.87
AV	197.282k	36.33	66.00	-29.67	19.47	Neutral	-	16.86	9.59	0.01	9.87
QP	252.795k	41.82	79.00	-37.18	19.47	Neutral	-	22.35	9.59	0.01	9.87
AV	252.795k	33.18	66.00	-32.82	19.47	Neutral	-	13.71	9.59	0.01	9.87
QP	453.236k	44.34	79.00	-34.66	19.48	Neutral	-	24.86	9.59	0.01	9.88
AV	453.236k	38.59	66.00	-27.41	19.48	Neutral	-	19.11	9.59	0.01	9.88
QP	910.485k	36.90	73.00	-36.10	19.49	Neutral	-	17.41	9.59	0.02	9.88
AV	910.485k	29.46	60.00	-30.54	19.49	Neutral	-	9.97	9.59	0.02	9.88
QP	1.67M	38.76	73.00	-34.24	19.53	Neutral	-	19.23	9.61	0.03	9.89
AV	1.67M	27.54	60.00	-32.46	19.53	Neutral	-	8.01	9.61	0.03	9.89
QP	22.079M	48.36	73.00	-24.64	19.69	Neutral	-	28.67	9.68	0.11	9.90
AV	22.079M	47.90	60.00	-12.10	19.69	Neutral	"Worst"	28.21	9.68	0.11	9.90

Summary

Mode	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Condition	Azimuth (°)	Height (m)
Mode 1	QP	34.25M	35.62	39.00	-3.38	-14.52	Vertical	85	1.00

Mode 1

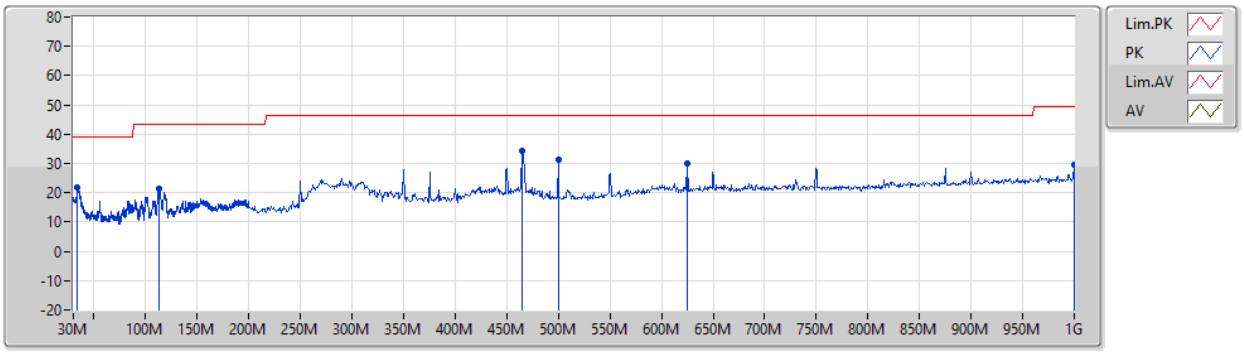
15/06/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	113.13M	25.33	43.50	-18.17	-15.34	10	Vertical	-	-	-	40.67	10.49	2.53	28.36
PK	144.75M	25.24	43.50	-18.26	-13.49	10	Vertical	-	-	-	38.73	11.80	2.94	28.23
PK	464.8M	38.26	46.40	-8.14	-17.92	10	Vertical	-	-	-	56.18	17.10	5.30	40.32
PK	750.4M	28.34	46.40	-18.06	-12.38	10	Vertical	-	-	-	40.72	20.70	6.83	39.91
PK	1G	29.67	49.50	-19.83	-8.84	10	Vertical	-	-	-	38.51	22.70	8.00	39.54
QP	34.25M	35.62	39.00	-3.38	-14.52	10	Vertical	85	1.00	"Worst"	50.14	12.70	1.36	28.58

Mode 1

15/06/2019



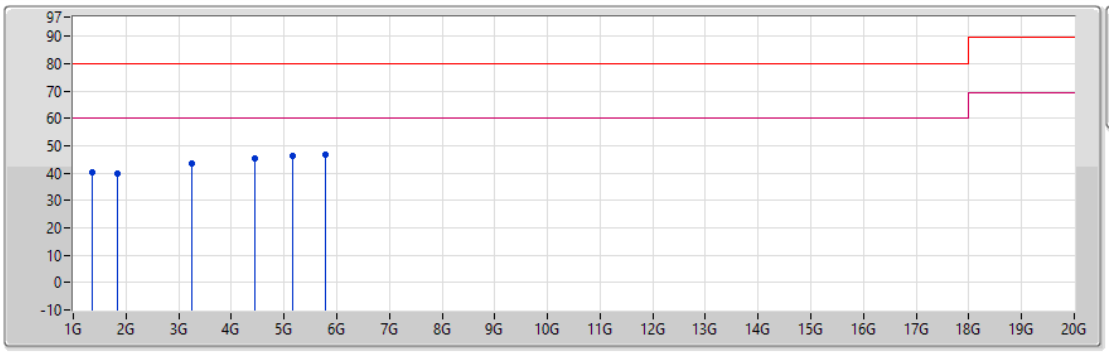
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	34.25M	21.76	39.00	-17.24	-14.52	10	Horizontal	-	-	-	36.28	12.70	1.36	28.58
PK	113.47M	21.20	43.50	-22.30	-15.37	10	Horizontal	-	-	-	36.57	10.45	2.54	28.36
PK	464.8M	34.12	46.40	-12.28	-17.92	10	Horizontal	220	1.85	"Worst"	52.04	17.10	5.30	40.32
PK	500M	31.48	46.40	-14.92	-17.09	10	Horizontal	-	-	-	48.57	17.70	5.48	40.27
PK	624.8M	29.89	46.40	-16.51	-14.47	10	Horizontal	-	-	-	44.36	19.40	6.23	40.10
PK	1G	29.64	49.50	-19.86	-8.84	10	Horizontal	-	-	-	38.48	22.70	8.00	39.54

Summary

Mode	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Condition	Azimuth (°)	Height (m)
Mode 1	PK	5.93G	46.98	80.00	-33.02	4.39	Horizontal	200	1

Mode 1

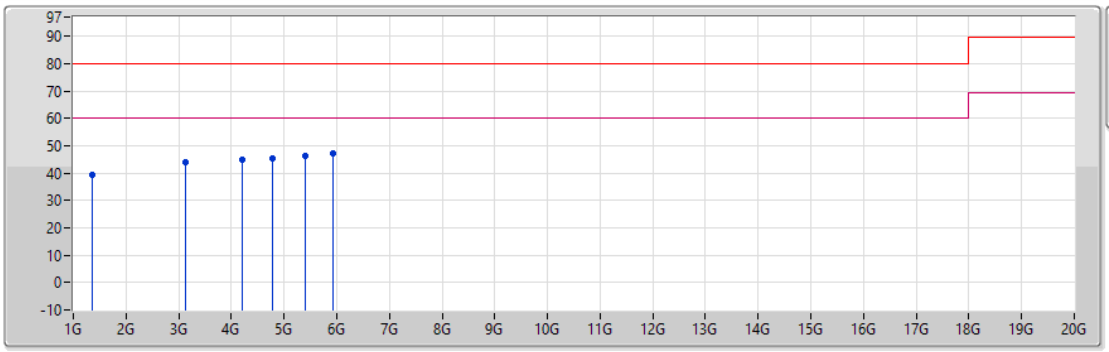
14/06/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	1.35G	40.46	80.00	-39.54	-5.35	3	Vertical	-	-	-	45.81	25.55	2.79	33.69
PK	1.845G	40.01	80.00	-39.99	-3.97	3	Vertical	-	-	-	43.98	26.25	3.25	33.47
PK	3.255G	43.70	80.00	-36.30	-0.60	3	Vertical	-	-	-	44.30	28.70	4.63	33.93
PK	4.435G	45.24	80.00	-34.76	1.93	3	Vertical	-	-	-	43.31	30.54	5.30	33.91
PK	5.16G	46.18	80.00	-33.82	3.23	3	Vertical	-	-	-	42.95	31.63	5.48	33.88
PK	5.785G	46.88	80.00	-33.12	4.09	3	Vertical	190	1	"Worst"	42.79	32.20	5.80	33.91

Mode 1

14/06/2019



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	1.35G	39.57	80.00	-40.43	-5.35	3	Horizontal	-	-	-	44.92	25.55	2.79	33.69
PK	3.13G	43.85	80.00	-36.15	-0.80	3	Horizontal	-	-	-	44.65	28.65	4.49	33.94
PK	4.21G	44.87	80.00	-35.13	1.50	3	Horizontal	-	-	-	43.37	30.00	5.40	33.90
PK	4.79G	45.46	80.00	-34.54	2.66	3	Horizontal	-	-	-	42.80	31.24	5.32	33.90
PK	5.4G	46.09	80.00	-33.91	3.43	3	Horizontal	-	-	-	42.66	31.68	5.61	33.86
PK	5.93G	46.98	80.00	-33.02	4.39	3	Horizontal	200	1	"Worst"	42.59	32.47	5.86	33.94