ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

FCC Applicant:	MICHELIN NORTH AMERICA (US) INC. One Parkway South, Greenville, South Carolina 29615, United States
FCC Manufacturer:	MICHELIN NORTH AMERICA (US) INC. One Parkway South, Greenville, South Carolina 29615, United States
ISED Applicant:	MICHELIN NORTH AMERICA (CANADA) INC. 2863 Granton Road New Glasgow NS B2H 5C6 Canada
ISED Manufacturer:	MICHELIN NORTH AMERICA (CANADA) INC. 2863 Granton Road New Glasgow NS B2H 5C6 Canada
Product Name:	MEMS EVOLUTION 4 LIQUID PROOF SENSOR
Brand Name:	MICHELIN
Model No.:	RV1-30
Model Difference:	N/A
Report Number:	TERF2208001371ER
FCC ID	FI5-RV1-30G
IC:	5056A-RV130G
Date of EUT Received:	Aug. 16, 2022
Date of Test:	Sep. 19, 2022~Aug. 10, 2023
Issue Date:	Aug. 14, 2023

Approved By _____
Jim Chang

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT comply with FCC rule part §15.231, ISED RSS-210.

The results of this report relate only to the sample identified in this report.

Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
TERF2208001371ER	00	Original	Oct. 26, 2022	Candice Li	
TERF2208001371ER	01	Correct P.1; General Information; Control Units; Data Rate; clause 8.3-3, 9.4	Aug. 7, 2023	Candice Li	*
TERF2208001371ER	02	Correct clause 3, 9.4, 10	Aug. 11, 2023	Candice Li	*
TERF2208001371ER	03	Correct Date of Test; P.4 Model, Section 6.2	Aug. 14, 2023	Candice Li	*

Note:

1、The remark "*" indicates modification of the report upon requests from certification body.

Contents

1 GENERAL INFORMATION

1.1 Product Description

Product Name:	MEMS EVOLUTION 4 LIQUID PROOF SENSOR
Brand Name:	MICHELIN
Model No.:	RV1-30
Model Difference:	N/A
Hardware Version:	N/A
Firmware Version:	N/A
EUT Series No.:	31751395
Power Supply:	Transmitter Operating Voltage: 3Vdc from Lithium Battery
Test Software (Name/Version)	N/A

1.2 RF specification

Radio Technology:	Short Range Radio
Operating Frequency	433.92MHz
Transmit Power	≤ 86.48 dBuV/m Max.
Modulation Technique	FSK
Antenna Type	Internal helical Antenna

Note: Antenna information is provided by the applicant.

1.3 Test Methodology

FCC Part 15, Subpart C §15.231
RSS-210 issue 10 December 2019
RSS-Gen, Issue 5
ANSI C63.10:2013

1.4 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 2		
		SAC 3		
		Conduction 1		
		Conducted 1		
		Conducted 2		
		Conducted 3		
		Conducted 4		
		Conducted 5		
		Conducted 6		
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction C	TW0028	
		SAC C		
		SAC D		
		SAC G		
		Conducted A		
		Conducted B		
		Conducted C		
		Conducted D		
		Conducted E		
		Conducted F		
		Conducted G		

Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.

1.5 Special Accessories

There are no special accessories used while test was conducted.

1.6 Equipment Modifications

There was no modification incorporated into the EUT.

2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on a table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz. The CISPR Quasi-Peak and Average detector mode is employed. The two LISNs provide 50uH/50 ohm of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is a placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.

2.4 Measurement Results Explanation Example

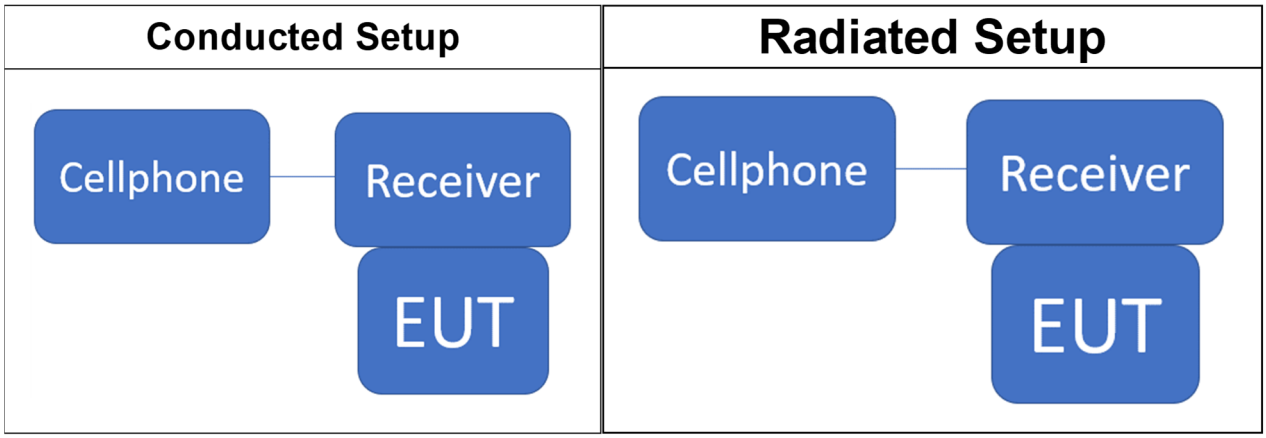
2.4.1 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m*6m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.
There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

2.4.2 For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

2.5 Test Configuration



2.6 Control Unit(s)

Conducted Emission Test Site: Conducted 2					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Smart Phone	SAMSUNG	SM-G965F/DS	RF8K301E9VJ	N/A	N/A
Receiver	MICHELIN	MEMS3	N/A	N/A	N/A
Radiated Emission Test Site: SAC 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Test Software	audix	e3	Ver. 9 210322	N.C.R	N.C.R
Smart Phone	SAMSUNG	SM-G965F/DS	RF8K301E9VJ	N/A	N/A
Receiver	MICHELIN	MEMS3	01/10/1900	N/A	N/A

NOTE: N.C.R refers to Not Calibrated Required.

3 SUMMARY OF TEST RESULTS

FCC Rules	ISED Rules	Description Of Test	Result
§15.207	RSS-Gen § 8.8	AC Power Line Conducted Emission	N/A
§15.231(b)	RSS-210 A1.2	Radiated Emission	Compliant
§15.231(c)	RSS-210 A1.3	Emission Bandwidth	Compliant
§15.35 (c)	RSS-Gen § 8.2	Duty Cycle Test (Determining average factor from a complete pulse train)	Compliant
§15.231(a)(2)	RSS-210 A1.1 (b)	Transmission Ceased Time	Compliant
§15.203	N/A	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

4.1 The Worst Test Modes and Channel Details

RADIATED EMISSION TEST (BELOW 1 GHz)		
MODE	MODULATION	DATA RATE (kHz)
433 MHz	FSK	5
RADIATED EMISSION TEST (ABOVE 1 GHz)		
MODE	MODULATION	DATA RATE (kHz)
433 MHz	FSK	5

Note:

The field strength of radiated emission was measured as the EUT positioned in different orthogonal planes (E1/E2/H) based on actual usage of the EUT to pre-scan the emissions for determining the worst case scenario.

ANTENNA PORT CONDUCTED TEST		
MODE	MODULATION	DATA RATE (kHz)
433 MHz	FSK	5

5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty		
AC Power Line Conducted Emission	+/-	2.34	dB
Frequency Stability	+/-	1.53	Hz
Emission Bandwidth	+/-	1.53	Hz
Temperature	+/-	0.4	°C
Humidity	+/-	3.5	%
DC / AC Power Source	+/-	1	%

Radiated Spurious Emission Measurement Uncertainty				
Polarization: Vertical	**+/-**	**2.57**	**dB**	9kHz~30MHz
	+/-	**4.85**	**dB**	30MHz - 1000MHz
	+/-	**4.45**	**dB**	1GHz - 18GHz
	+/-	**4.24**	**dB**	18GHz - 40GHz
Polarization: Horizontal	**+/-**	**2.57**	**dB**	9kHz~30MHz
	+/-	**4.37**	**dB**	30MHz - 1000MHz
	+/-	**4.45**	**dB**	1GHz - 18GHz
	+/-	**4.24**	**dB**	18GHz - 40GHz

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

6 MEASUREMENT EQUIPMENT USED

6.1 Emission from AC power line

N/A

6.2 Conducted Measurement

Conducted Emission Test Site: Conducted 2					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY60242392	12/17/2021	12/16/2022
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY59071541	07/13/2023	07/12/2024
DC Block	Mini-Circuits	BLK-18-S+	1	12/14/2021	12/13/2022
DC Block	Mini-Circuits	BLK-18-S+	1	12/13/2022	12/12/2023

6.3 Radiated Measurement

Radiated Emission Test Site: SAC 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Horn Antenna	SCHWARZBECK	BBHA9120D	1441	09/27/2022	09/26/2023
Bi-log Antenna	SCHWARZBECK	VULB9168	378	08/15/2022	08/14/2023
Loop Antenna	ETS.LINDGREN	6502	143303	05/14/2022	05/13/2023
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2022	04/26/2023
EMI Test Receiver	R&S	ESCI 7	100759	08/22/2022	08/21/2023
Pre-Amplifier	HP	8449B	3008A00578	12/16/2021	12/15/2022
Pre-Amplifier	HP	8447D	2944A07676	12/16/2021	12/15/2022
Attenuator	Mini-Circuit	BW-S10W2+	4	12/14/2021	12/13/2022
Bandreject Filter 430-436	Titan	T04H86002600060S01	210619-2-6	12/14/2021	12/13/2022
1GHz High Pass Filter	Micro-Tronics	HPM50108	32	12/14/2021	12/13/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY2636/2	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 104	340057/4	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 104PEA	800052/2	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY2621/2	12/16/2021	12/15/2022
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY2617/2	12/16/2021	12/15/2022
Site Cal	SGS	SAC 3	N/A	01/01/2022	12/31/2022

NOTE: N.C.R refers to Not Calibrated Required.

7 CONDUCTED EMISSIONS TEST

7.1 Standard Applicable

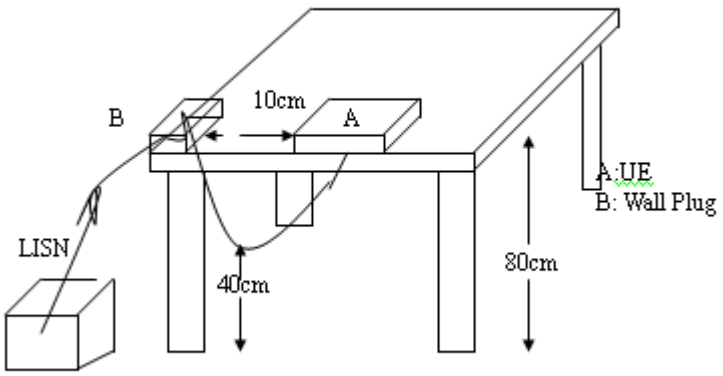
According to §15.207 and RSS-Gen §8.8, frequency within 150 kHz to 30MHz shall not exceed the limit table as below.

Frequency range MHz	Limits (dBuV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

7.2 EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

7.3 Test Set-up:



7.4 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

7.5 Measurement Result

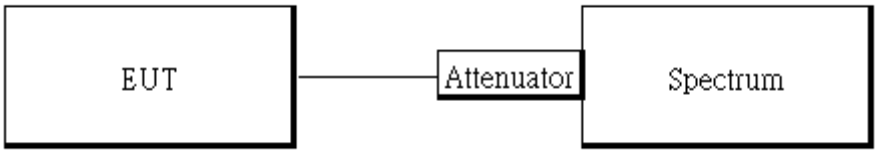
N/A; Powered from button battery.

8 DUTY CYCLE MEASUREMENT

8.1 Applicable Standard

According to 15. 35(c) and RSS-Gen §8.2, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification.

8.2 Test Setup



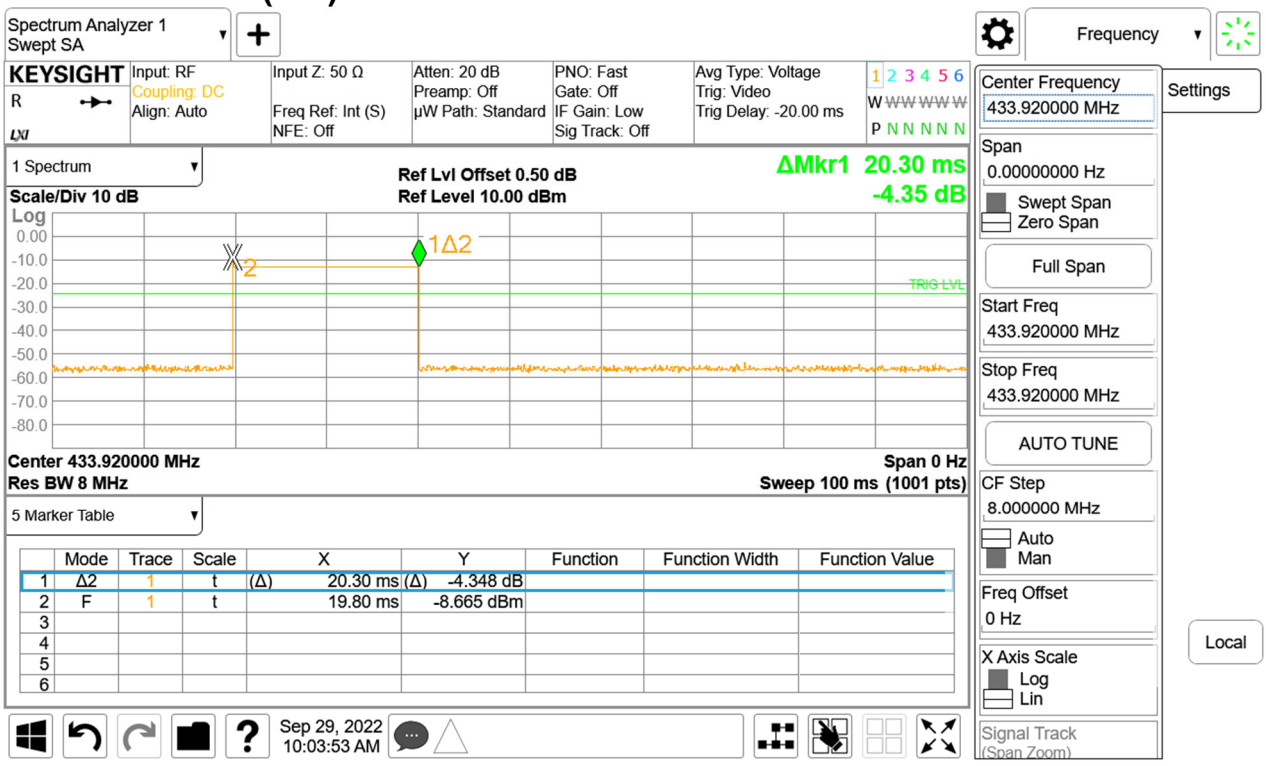
8.3 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT normal operating mode.
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 8MHz, Span =0 Hz. Adjacent sweep.
4. Set SPA View. Mark delta.

8.4 Measurement Results:

Ton (ms)	TP=Ton+Toff (ms)	Avg correction factor(dB) = 20log(Ton/TP)
20.3	100	-13.85

.Ton =20.3(ms)



9 EMISSION BANDWIDTH

9.1 Applicable Standard

According to 15.231 (c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

According RSS-Gen §6.7: The 99% bandwidth of momentarily operated devices shall be less or equal to 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the 99% bandwidth shall be less or equal to 0.5% of the centre frequency.

9.2 Test Setup

Refer to section 8.2 of this report.

9.3 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as transmitting mode.
3. Set SPA Center Frequency = fundamental frequency, RBW=1% to 5% OBW, VBW= 3 x RBW, Span = large enough to capture all products of the modulation process.
4. Set SPA -20dB Occupied bandwidth.
5. Set SPA 99% Occupied bandwidth.

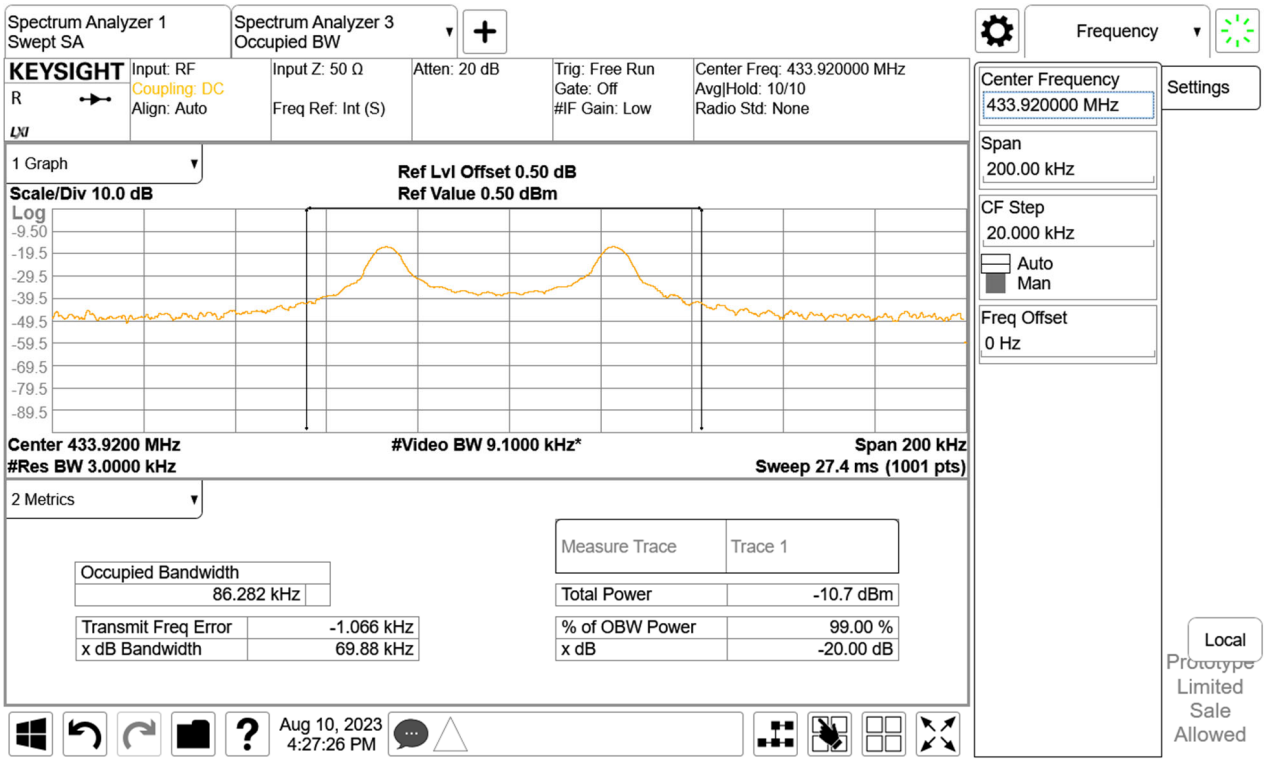
9.4 Measurement Results

The center frequency **f_c is 433.92MHz,** according to the Rules, section 15.231(C) & RSS-210 A1.3, the Bandwidth of Center Frequency should be calculated as following:

433.92 X 0.0025 = 1.0848 (MHz)

Frequency(MHz)	20dB BW(MHz)	OBW (MHz)	Limit (MHz)	Result
433.92	0.06988	0.086282	1.0848	Pass

433.92MHz



10 TRANSMISSION CEASED TIME MEASUREMENT:

15.231 (a) (2) and RSS-210 Annex A.1.1 A transmitter activated automatically shall cease transmission within 5 seconds after activation.

10.1 Test Setup

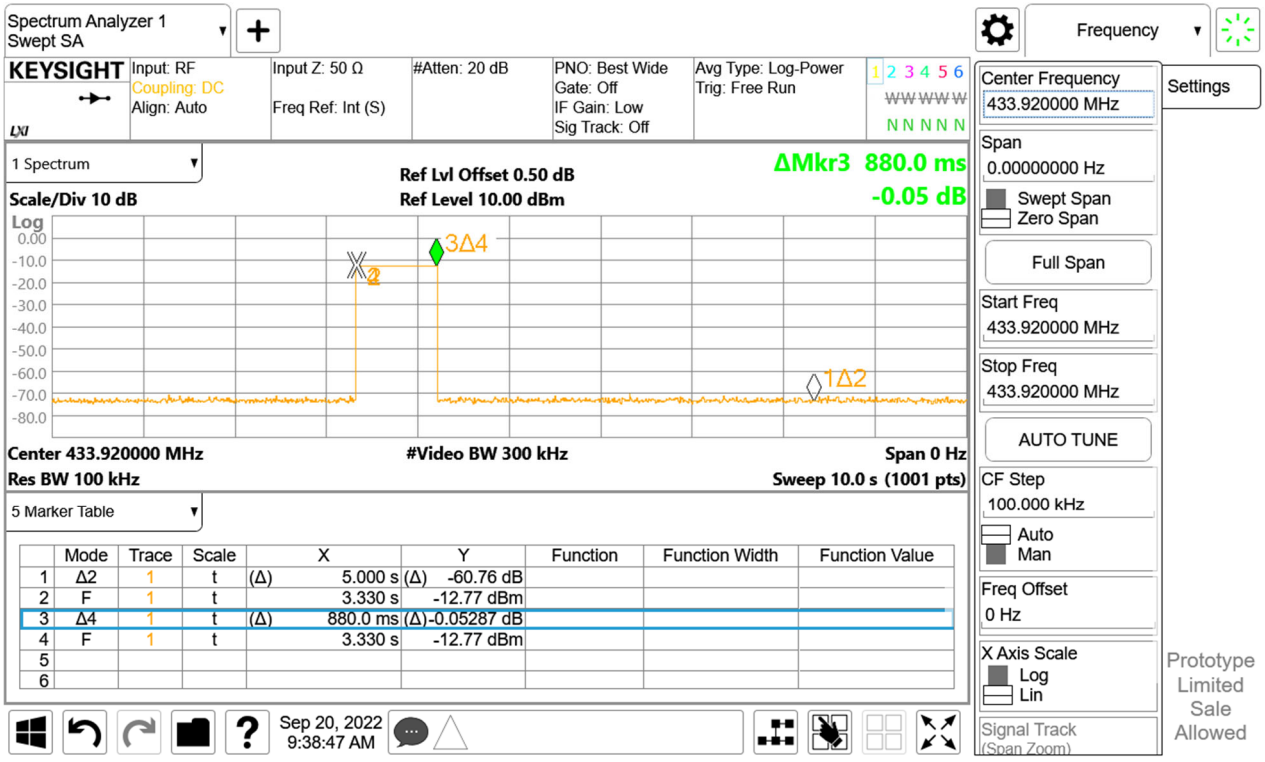
Refer to 8.2 of this report.

10.2 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set SPA Center Frequency = fundamental frequency, RBW=100kHz, VBW= 100kHz, Span =0Hz. Sweep Time= 5s.
3. Set EUT as normal operation and press Transmitter bottom for 2 s approximately,
4. Set SPA Max hold. Delta Mark.

10.3 Measurement Results

The release time is less than 5 s.



11 RADIATED EMISSION TEST

11.1 Standard Applicable

According to 15.231(b) and RSS-210 A1.2, the field strength of emissions from Intentional Radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious	
	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)
40.66 - 40.70	67.04	2,250	47	225
70 - 130	61.94	1,250	41.9	125
130 - 174	* 61.94 - 71.48	* 1,250 -3,750	* 41.9 – 51.48	* 125 to 375
174 – 260**	71.48	3,750	51.48	375
260 – 470**	* 71.48 - 81.94	* 3,750 - 12,500	* 51.48 – 61.94	* 375 to 1250
above 470	81.94	12,500	61.94	1250

* Linear interpolation with frequency, f, in MHz:

For 130-174 MHz: Field Strength (μV/m) = (56.82 x f)-6136
For 260-470 MHz: Field Strength (μV/m) = (41.67 x f)-7083
** Frequency bands 225-328.6 MHz and 335.4-399.9 MHz are designated for the exclusive use of the Government of Canada. Manufacturers should be aware of possible harmful interference and degradation of their licence-exempt radio equipment in these frequency bands.

11.2 Remark:

1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205 and RSS-Gen §8.10
4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of §15.205 and RSS-Gen §8.10, then the general radiated emission limits in § 15.209 and RSS-Gen §8.9 Table 5 apply.
5. For the band 130-174MHz, uV/m at 3meters = 56.81818(F) – 6136.3636;
   For the band 260-470MHz uV/m at 3meters = 41.6667(F) – 7083.3333;
   Where F is the frequency in MHz.

Fundamental Frequency (MHz)	**41.6667(F) – 7083.3333 (uV/m)**	**Limit (dBuV/m)**
433.891	10995.6029	80.82

11.3 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency of the interest measured were complete.

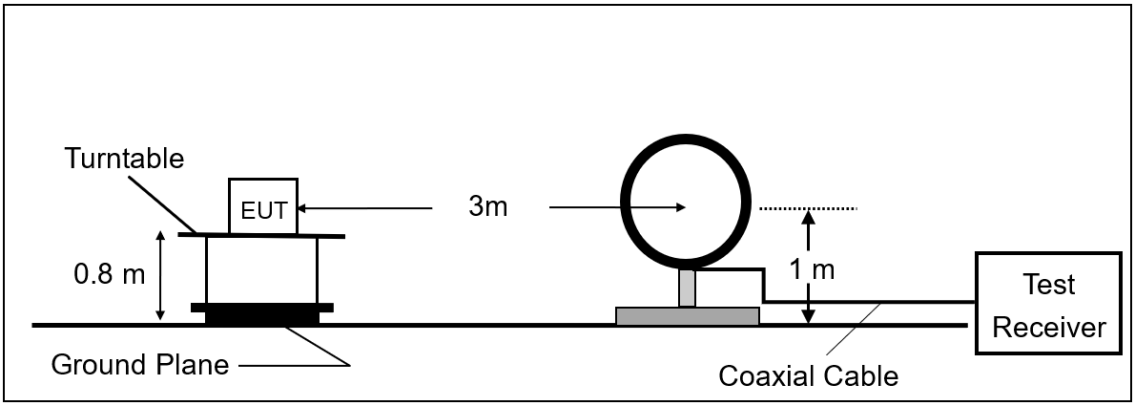
11.4 Auxiliary Procedure (Setting on Spectrum to capture the reading of emission level):

(1) Span = wide enough to fully capture the emission being measured
(2) RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz, VBW ≥ RBW,
Sweep = auto, Detector function = peak, Trace = max hold
(3) For average measurement: use duty cycle correction factor method per 15.35(c)
Duty Cycle = On time/100 milliseconds
On time = N1*L1+N2*L2+…+N(n-1)*L(n-1)+N(n)*L(n)
Where N1 is number of type 1 pulses, L1 is length of type 1 pulses, etc.
Average Emission Level = Peak Emission Level + 20*log (duty Cycle)

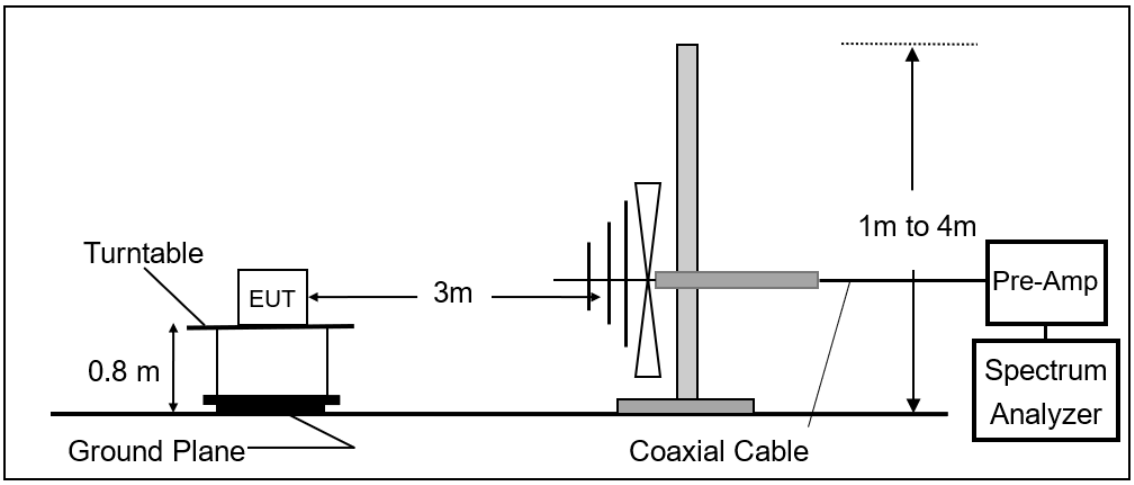
Test was measured starting from 9kHz to 10th harmonic of the fundamental frequency, and data containing the worst result above 30MHz are shown on the test report.

11.5 Test Setup

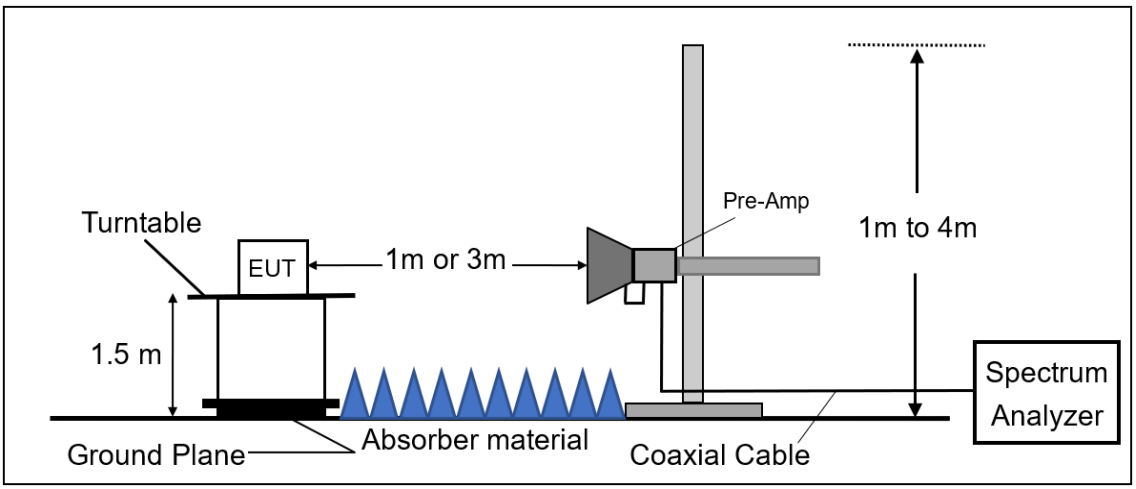
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency From 30MHz to 1000MHz.



(C) Radiated Emission Test Set-Up, Frequency Above 1GHz.



11.6 Field Strength Calculation

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

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Remark:

The limit of the emission level is expressed in dBuV/m, which converts 20*log(uV/m)

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

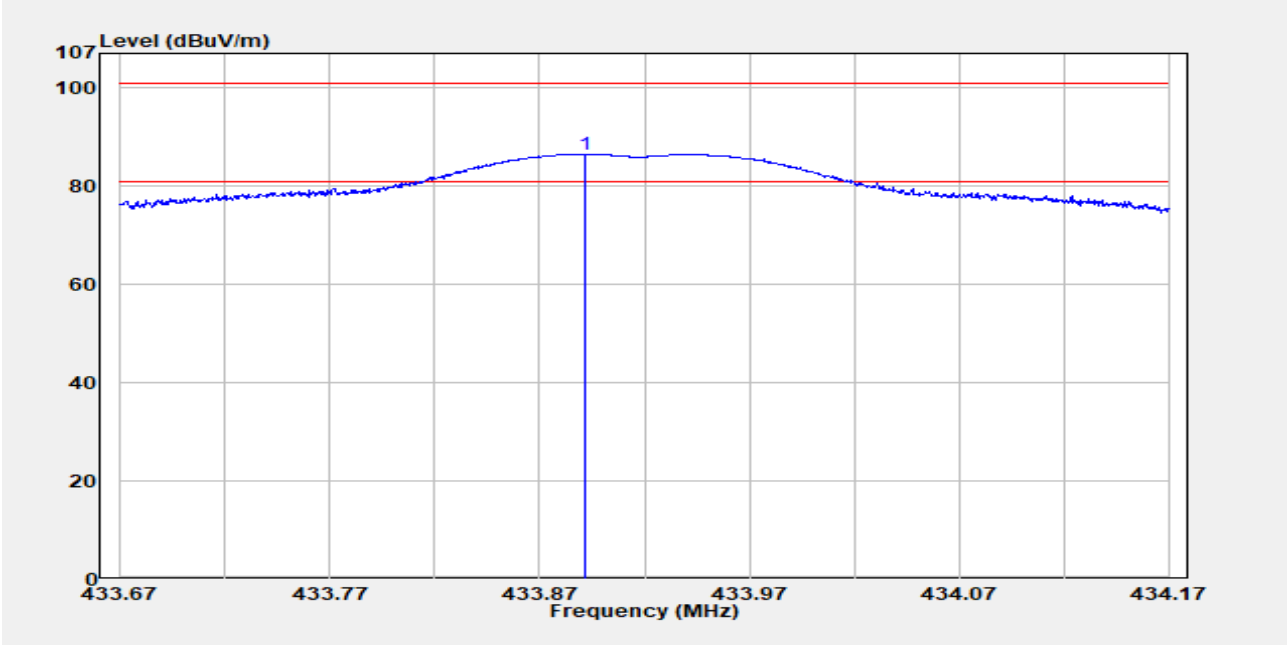
Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

11.7 Measurement Results of Radiated Spurious Emissions from 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) & RSS-GEN §6.13.2 was not reported.

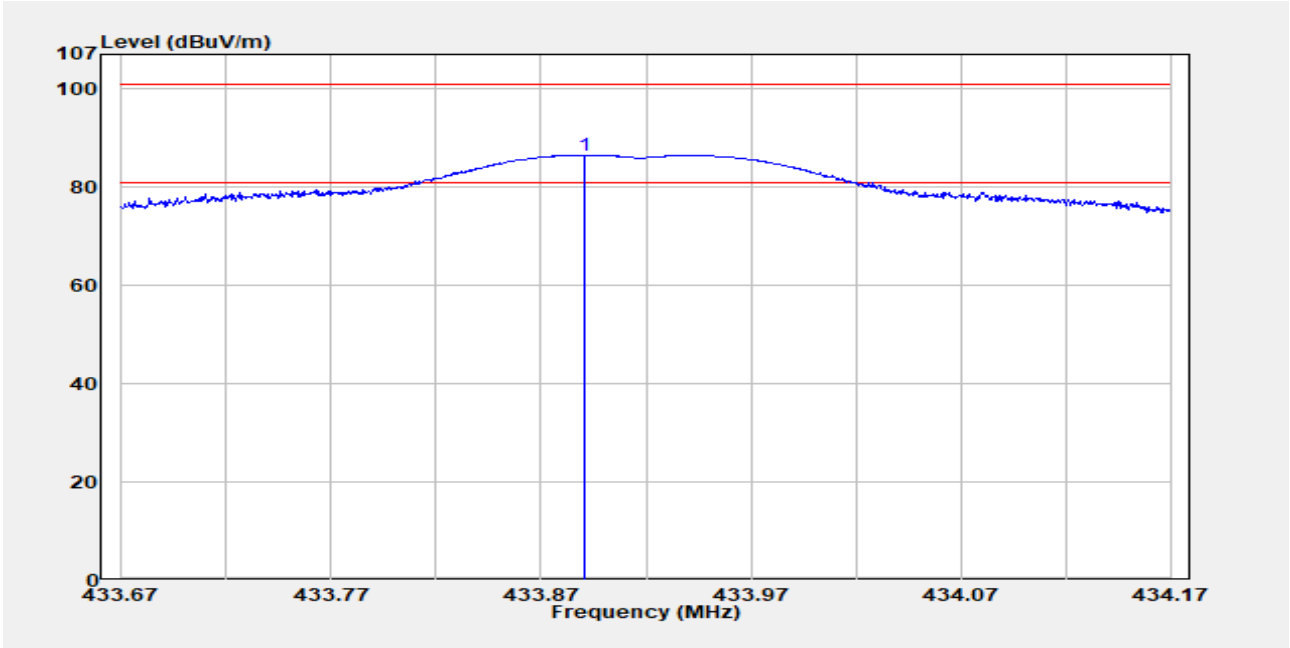
11.8 Measurement Result

Report Number	:TERF2208001371ER	Test Site	:SAC 3
Operation Mode	:UHF Band	Test Date	:2022-09-29
Test Frequency	:433.92 MHz	Temp./Humi.	:24.6/66
Test Mode	:Main	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plane	Engineer	:Nick Lin



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
433.892	Peak	90.30	-3.87	86.43	100.83	-14.40
433.892	Average	---	-13.85	72.58	80.83	-8.25

Report Number	:TERF2208001371ER	Test Site	:SAC 3
Operation Mode	:UHF Band	Test Date	:2022-09-29
Test Frequency	:433.92 MHz	Temp./Humi.	:24.6/66
Test Mode	:Main	Antenna Pol.	:Horizontal
EUT Pol	:E2 Plane	Engineer	:Nick Lin

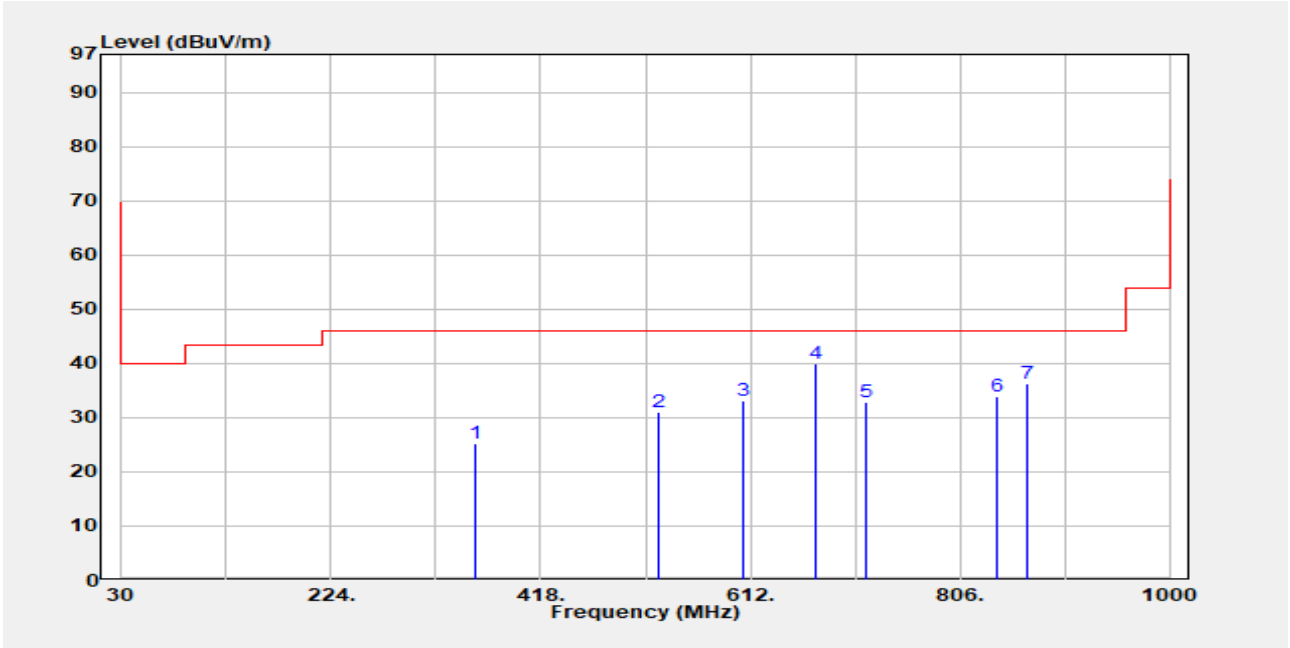


Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
433.891	Peak	90.34	-3.87	86.48	100.83	-14.35
433.891	Average	---	-13.85	72.63	80.83	-8.20

Note: Average Actual = Peak Actual + Average Factor

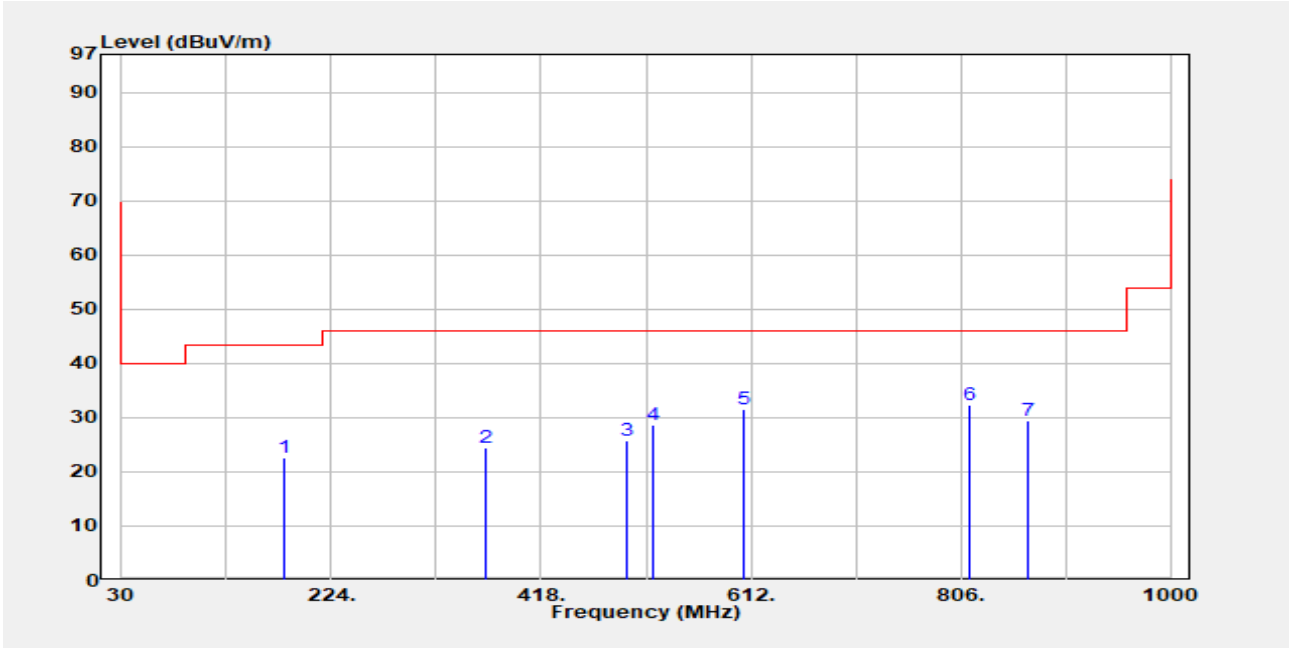
11.8.1 Field Strength of Spurious Emission

Report Number	:TERF2208001371ER	Test Site	:SAC 3
Operation Mode	:UHF Band	Test Date	:2022-09-29
Test Frequency	:433.92 MHz	Temp./Humi.	:24.6/66
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:E2 Plane	Engineer	:Nick Lin



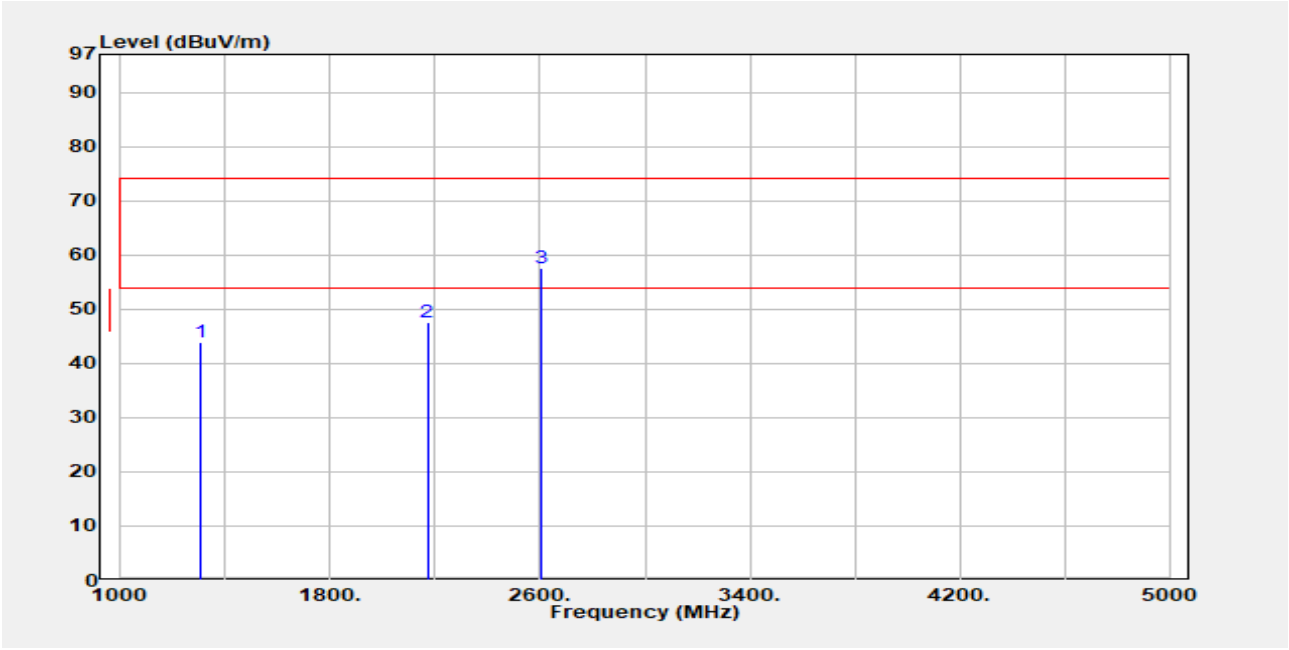
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
357.860	Peak	29.20	-4.08	25.12	46.00	-20.88
527.610	Peak	30.98	-0.06	30.93	46.00	-15.07
605.210	Peak	32.01	1.18	33.19	46.00	-12.81
672.140	Peak	38.53	1.46	39.99	46.00	-6.01
719.670	Peak	31.97	0.95	32.92	46.00	-13.08
839.950	Peak	29.38	4.45	33.83	46.00	-12.17
867.840	Peak	32.91	3.38	36.29	46.00	-9.71

Report Number	:TERF2208001371ER	Test Site	:SAC 3
Operation Mode	:UHF Band	Test Date	:2022-09-29
Test Frequency	:433.92 MHz	Temp./Humi.	:24.6/66
Test Mode	:Tx	Antenna Pol.	:Horizontal
EUT Pol	:E2 Plane	Engineer	:Nick Lin



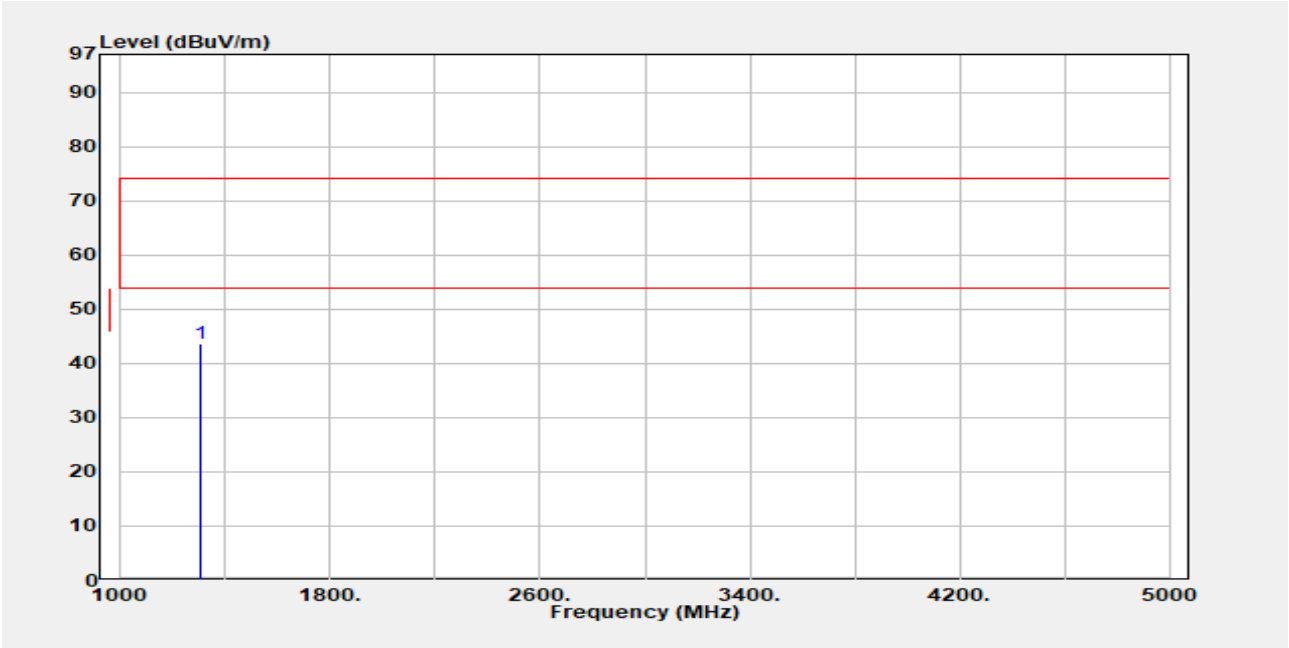
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
180.350	Peak	31.63	-9.02	22.61	43.50	-20.89
367.560	Peak	27.78	-3.29	24.49	46.00	-21.51
496.570	Peak	28.89	-3.03	25.86	46.00	-20.14
521.790	Peak	28.57	0.08	28.65	46.00	-17.35
605.210	Peak	30.28	1.18	31.47	46.00	-14.53
814.730	Peak	28.17	4.19	32.35	46.00	-13.65
867.840	Peak	26.04	3.38	29.42	46.00	-16.58

Report Number	:TERF2208001371ER	Test Site	:SAC 3
Operation Mode	:UHF Band	Test Date	:2022-09-29
Test Frequency	:433.92 MHz	Temp./Humi.	:24.6/66
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:E2 Plane	Engineer	:Nick Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
1301.760	Peak	45.89	-2.02	43.87	74.00	-30.13
1301.760	Average	---	-13.85	30.02	54.00	-23.98
2169.600	Peak	46.59	1.10	47.69	74.00	-26.31
2169.600	Average	---	-13.85	33.84	54.00	-20.16
2603.520	Peak	55.90	1.62	57.52	74.00	-16.48
2603.520	Average	---	-13.85	43.67	54.00	-10.33

Report Number	:TERF2208001371ER	Test Site	:SAC 3
Operation Mode	:UHF Band	Test Date	:2022-09-29
Test Frequency	:433.92 MHz	Temp./Humi.	:24.6/66
Test Mode	:Tx	Antenna Pol.	:Horizontal
EUT Pol	:E2 Plane	Engineer	:Nick Lin



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
1301.760	Peak	45.63	-2.02	43.62	74.00	-30.38
1301.760	Average	---	-13.85	29.77	54.00	-24.23

Note: Average Actual = Peak Actual + Average Factor

12 ANTENNA REQUIREMENT

12.1 Standard Applicable:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

12.2 Antenna Connected Construction:

The antenna complies with this requirement and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~