

# TEST REPORT



**Dt&C Co., Ltd.**

42, Yurim-ro, 154Beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea, 17042  
Tel : 031-321-2664, Fax : 031-321-1664

1. Report No : DRTFCC2304-0060

2. Customer

- Name (FCC) : Smart Radar System, Inc.
- Address (FCC) : 3rd Floor, Fine Venture Bldg, 41, Seongnam-daero 925gil, Bundang-gu, Seongnam-si South Korea 13496

3. Use of Report : FCC Original Grant

4. Product Name / Model Name : Milimeter wave radar / RETINA-4FN  
FCC ID : 2AVKZRETINA-4FN

5. FCC Regulation(s): Part 95(M)

Test Method Used : ANSI C63.26-2015, KDB653005 D01v01r02

6. Date of Test : 2021.02.10 ~ 2020.03.29

7. Location of Test :  Permanent Testing Lab  On Site Testing

8. Testing Environment : See appended test report.

9. Test Result : Refer to the attached test result.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
This test report is not related to KOLAS accreditation.

Affirmation	Tested by	Technical Manager
	Name : JaeHyeok Bang (Signature)	Name : JaeJin Lee (Signature)

2023 . 04 . 19 .

**Dt&C Co., Ltd.**

If this report is required to confirmation of authenticity, please contact to [report@dtnc.net](mailto:report@dtnc.net)

## Test Report Version

Test Report No.	Date	Description	Revised by	Reviewed by
DRTFCC2304-0060	Apr. 19, 2023	Initial issue	JaeHyeok Bang	JaeJin Lee

# Table of Contents

<b>1 GENERAL INFORMATION .....</b>	<b>4</b>
<b>2 INTRODUCTION .....</b>	<b>5</b>
2.1 EUT DESCRIPTION .....	5
2.2 TESTING ENVIRONMENT .....	5
2.3 MEASURING INSTRUMENT CALIBRATION.....	5
2.4 MEASUREMENT UNCERTAINTY .....	5
2.5 TEST FACILITY.....	6
<b>3 SUMMARY OF TEST RESULTS .....</b>	<b>7</b>
<b>4 TEST RESULTS.....</b>	<b>8</b>
4.1 OCCUPIED BANDWIDTH .....	8
4.2 EIRP .....	10
4.3 UNDESIRABLE EMISSIONS .....	13
4.4 FREQUENCY STABILITY .....	18
<b>5 LIST OF TEST EQUIPMENT .....</b>	<b>20</b>

## 1 GENERAL INFORMATION

<b>FCC Equipment Class</b>	VRD – Part95 Vehicular Radar System
<b>Product</b>	Radar module
<b>Model Name</b>	RETINA-4FN
<b>Add Model Name</b>	-
<b>Test Device Serial Number</b>	20
<b>Power Supply</b>	DC 12 V
<b>Antenna Type</b>	Patch Antenna

Frequency Range(MHz)	Emission Designator	Modulation	EIRP(Peak detector)		EIRP(Average detector)	
			Max power (dBm)	Max power (W)	Max power (dBm)	Max power (W)
77 000 ~ 79 000	1G63F1N	FMCW	23.64	0.231	17.86	0.061

## 2 INTRODUCTION

### 2.1 EUT DESCRIPTION

The Equipment under Test (EUT) supports 77 ~ 79 GHz vehicular radar.

#### Operation test setup for EUT

- Test software: TeraTerm
- Power setting: NA

### 2.2 TESTING ENVIRONMENT

Ambient Condition	
▪ Temperature	+21 °C ~ +25 °C
▪ Relative Humidity	40 % ~ 46 %

### 2.3 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 2.4 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C 63.4-2014. All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95 % level of confidence.

Parameter	Measurement uncertainty
Radiated emission (1 GHz Below)	4.8 dB (The confidence level is about 95 %, $k = 2$ )
Radiated emission (1 GHz ~ 18 GHz)	5.0 dB (The confidence level is about 95 %, $k = 2$ )
Radiated emission (18 GHz Above)	5.2 dB (The confidence level is about 95 %, $k = 2$ )

## 2.5 TEST FACILITY

**Dt&C Co., Ltd.**

The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042. The site is constructed in conformance with the requirements.

- FCC & IC MRA Designation No. : KR0034

- ISED #: 5740A

[www.dtnc.net](http://www.dtnc.net)

Telephone	:	+ 82-31-321-2664
-----------	---	------------------

FAX	:	+ 82-31-321-1664
-----	---	------------------

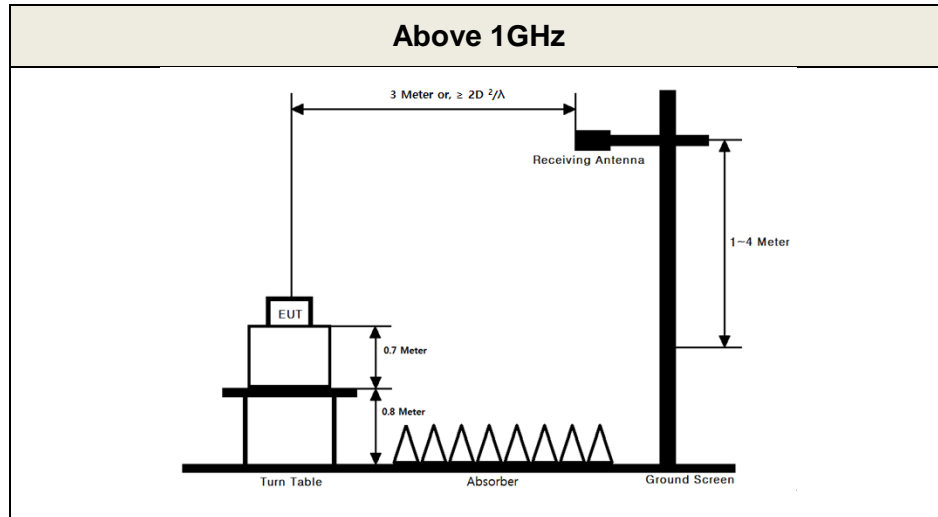
### 3 SUMMARY OF TEST RESULTS

FCC Part RSS Std.	Test Description	Test Limit	Test Condition	Status Note 1
2.1049	Occupied Bandwidth	N/A	Radiated	<b>C</b>
95.3367(a)	Maximum power(EIRP)	< 50 dBm (Averaging detector)		<b>C</b>
95.3367(b)	Maximum peak power(EIRP)	< 55 dBm (Peak detector)		<b>C</b>
2.1053 95.3379(a)	Undesirable Emissions	Below 40GHz < Part 95.3379 (a)(a) 40 ~ 200GHz < 600 pW/cm <sup>2</sup> Above 200GHz < 1000 pW/cm <sup>2</sup>		<b>C</b>
2.1055 95.3379(b)	Frequency Stability	Within the frequency bands		<b>C</b>
Note 1: <b>C</b> =Comply <b>NC</b> =Not Comply <b>NT</b> =Not Tested <b>NA</b> =Not Applicable				

## 4 TEST RESULTS

### 4.1 OCCUPIED BANDWIDTH

#### *Test Configuration*



These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 1.5-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

#### *Test Procedure*

##### - ANSI C63.26-2015 – Section 5.4.4

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

#### Test setting

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2.  $RBW = 1 \sim 5 \%$  of the expected OBW &  $VBW \geq 3 \times RBW$
3. Detector = Peak
4. Trance mode = Max hold
5. Sweep = Auto couple
6. The trace was allowed to stabilize
7. If necessary, step 2 ~ 6 were repeated after changing the RBW such that it would be within 1 ~ 5 % of the 99 % occupied bandwidth observed in step 6.

#### *Limit*

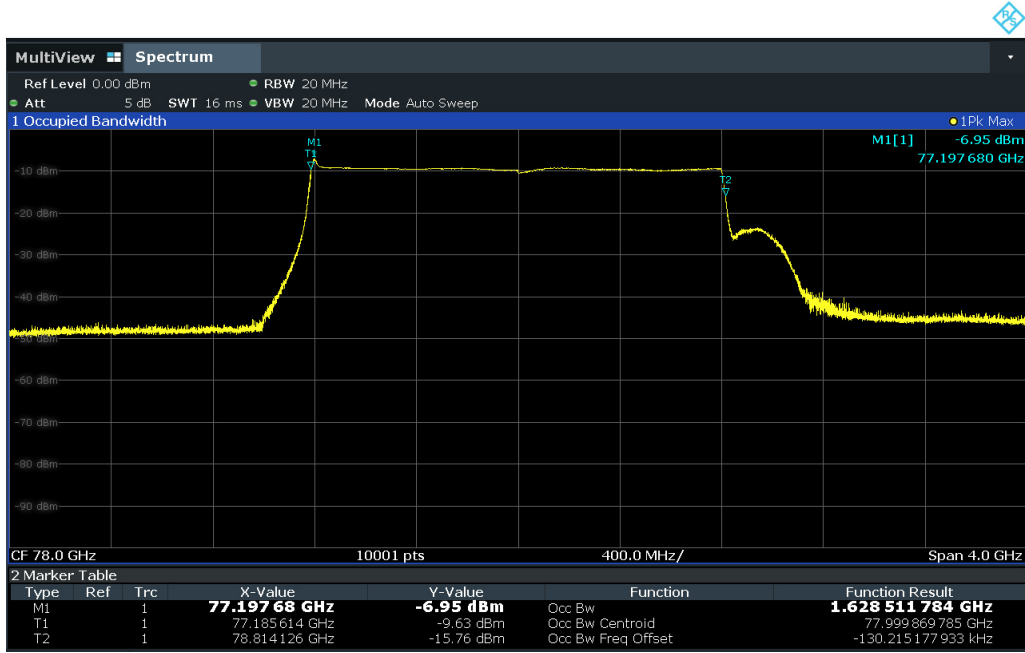
Within the designated 76~81GHz frequency band



**Test Results**

Frequency Range(MHz)	Occupied Bandwidth(MHz)
77 000 ~ 79 000	1 628.5

**Occupied Bandwidth**



**Emission Designator**

Emission Designator = **1G63F1N**

OBW = 1 628.5 MHz

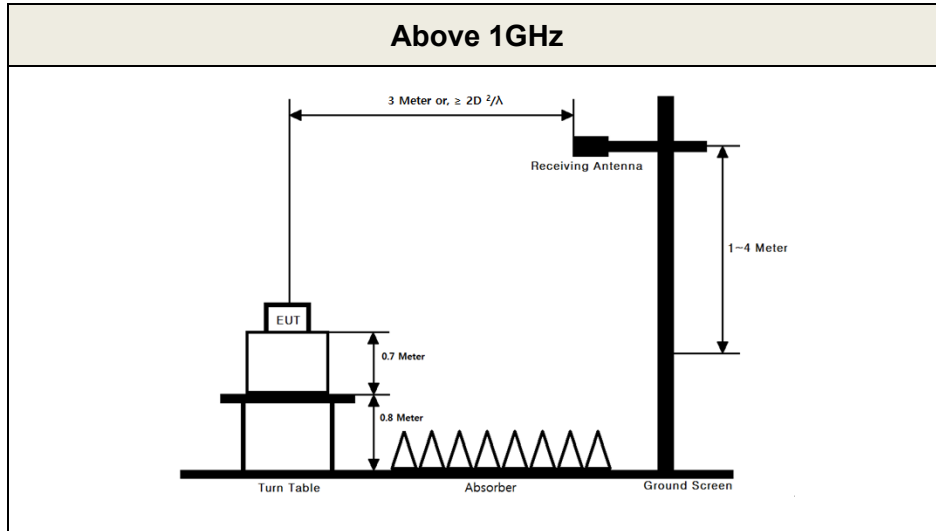
F = Frequency modulation

1 = A single channel containing quantized or digital information without the use of a modulating sub-carrier

N = No information transmitted

## 4.2 EIRP

### Test Configuration



These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 1.5-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

### Far field distance ( $R_m$ )

$$R_m = 2D^2 / \lambda,$$

where, D=the largest dimension of the antenna /  $\lambda$ =the wavelength of the emissions

Frequency Range(GHz)	D(cm)	$\lambda$ (cm)	$R_m$ (m)	Measurement Distance(m)
77.0 ~ 79.0	4.60	0.37	1.14	1.40

### **Test Procedure**

- **ANSI C63.26-2015 – Section 5.**
- **KDB 653005 D01v01r02 – Section 4**

#### **-Maximum power(EIRP) – Averaging detector**

The maximum fundamental emission power (EIRP) shall be measured using a power averaging (rms) detector with a 1 MHz resolution bandwidth (RBW) and integrated over the full 99% occupied bandwidth (OBW) to obtain the data necessary to demonstrate compliance to the 50 dBm limit.

#### **-Maximum peak power(EIRP) – Peak detector**

The maximum peak fundamental emission power (EIRP) measurement shall be performed by sweeping over the transmitted occupied bandwidth using a positive peak power detector with peak hold activated, and a 1 MHz RBW. Power integration is not to be used in performing this measurement. The resultant peak power spectral density (maximum in any 1 MHz) data shall be used to demonstrate compliance to the 55 dBm/MHz limit.

- 1) Peak power measurements of swept frequency radar implementations (e.g., high sweep rate FMCW) may require a desensitization correction factor to be applied to the measurement results. See relevant Application Note(s) from the measurement instrumentation vendor for details.

## Limit

### - Part 95.3367

The fundamental radiated emission limits within the 76-81 GHz band are expressed in terms of Equivalent Isotropically radiated Power (EIRP) and are as follows:

- (a) The maximum power (EIRP) within the 76-81 GHz band shall not exceed 50 dBm based on measurements employing a power averaging detector with a 1 MHz Resolution Bandwidth (RBW).
- (b) The maximum peak power (EIRP) within the 76-81 GHz band shall not exceed 55 dBm based on measurements employing a peak detector with a 1 MHz RBW.

## Test Results

Maximum power(EIRP) – Averaging detector & Maximum peak power(EIRP) – Peak detector

Measurement distance(D)	Frequency (GHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Measured Level(dBm)	AFCL (dB/m)	DCF (dB)	E (dBuV/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1.4 m	78.971 12	H	Z	PK	-43.70	48.78	13.44	125.52	23.64	55.00	31.36
1.4 m	78.000 00	H	Z	AV	-35.93	48.67	NA	119.74	17.86	50.00	32.14

### Note.

1. The EIRP was measured in each axis EUT positions and the worst case data was reported.
2. For peak power measurement, a desensitization correction factor was applied to the measurement results.
3. Sample Calculation.

$$E(\text{dBuV/m}) = \text{Measured level (dBuV)} + 107 + \text{AFCL}(\text{dB/m}) + \text{DCF}(\text{dB})$$

where, E=field strength / DCF = Desensitization Correction Factor / AFCL = Antenna Factor(dB/m) + Cable Loss(dB)

$$\text{EIRP}(\text{dBm}) = E(\text{dBuV/m}) + 20\log(D) - 104.8; \text{ where, D is measurement distance (in the far field region) in m.}$$

4. DCF Calculation

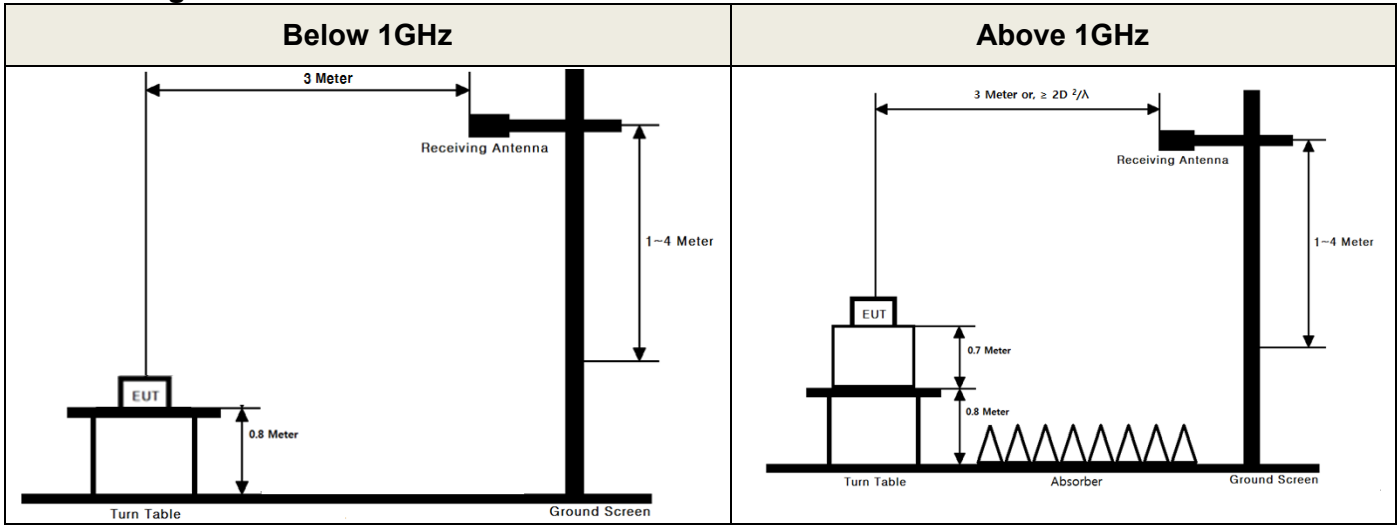
$$\text{DCF} = 5 \times \log(1 + K \times (\text{Sweep bandwidth} / (\text{chirp length} \times \text{RBW}^2))^2)$$

$$= 5 \times \log(1 + 0.1947 \times (2.0\text{GHz} / (40\mu\text{s} \times 1\text{MHz}^2))^2) = 13.44 \text{ dB}$$

K = a correction factor for the settling process of the gaussian shaped filter (0.1947)

### 4.3 UNDESIRABLE EMISSIONS

#### Test Configuration



These measurements were performed at 3 test site. The equipment under test is placed on a non-conductive table 1.5-meters above a turntable which is flush with the ground plane and 3 meters(for below 1GHz: 0.8-m) from the receive antenna. For measurements above 1GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

#### Far field distance (R<sub>m</sub>)

$$R_m = 2D^2 / \lambda,$$

where, D=the largest dimension of the measurement antenna / λ=the wavelength of the emissions

Frequency Range(GHz)	D(cm)	λ (cm)	Rm (m)	Measurement Distance(m)
18 ~ 40	5.20	0.75	0.72	1.50
40 ~ 60	6.20	0.50	1.54	1.60
60 ~ 90	4.60	0.33	1.27	1.40
90 ~ 140	2.60	0.21	0.63	1.00
140 ~ 220	1.90	0.14	0.53	0.80
220 ~ 243	1.70	0.13	0.45	0.50

#### Test Procedure

- ANSI C63.26-2015 – Section 5.5

#### Test setting

##### Below 1GHz

RBW = 100 or 120 kHz, VBW = 3 x RBW, Detector = Peak or Quasi Peak

##### 1~40 GHz

Peak Measurement

RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Sweep time = Auto, Trace mode = Max Hold until the trace stabilizes

Average Measurement

RBW = 1 MHz, VBW = 3 MHz, Detector = RMS, Sweep time = Auto, Trace mode = Averaging or Max hold

##### Above 40GHz

Average Measurement

RBW = 1 MHz, VBW = 3 MHz, Detector = RMS, Sweep time = Auto, Trace mode = Averaging or Max hold

## Limit

### Part 95.3379

(a) The power density of any emissions outside the 76-81 GHz band shall consist solely of spurious emissions and shall not exceed the following:

(1) Radiated emissions below 40 GHz shall not exceed the field strength as shown in the following emissions table.

Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)
0.009 – 0.490	2 400/F (kHz)	300
0.490 – 1.705	24 000/F (kHz)	30
1.705 – 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

- (i) In the emissions table in paragraph (a)(1) of this section, the tighter limit applies at the band edges.
  - (ii) The limits in the table in paragraph (a)(1) of this section are based on the frequency of the unwanted emissions and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
  - (iii) The emissions limits shown in the table in paragraph (a)(1) of this section are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9.0-90.0 kHz, 110.0-490.0 kHz, and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector with a 1 MHz RBW.
- (2) The power density of radiated emissions outside the 76-81 GHz band above 40.0 GHz shall not exceed the following, based on measurements employing an average detector with a 1 MHz RBW:
- (i) For radiated emissions outside the 76-81 GHz band between 40 GHz and 200 GHz from field disturbance sensors and radar systems operating in the 76-81 GHz band: 600 pW/cm<sup>2</sup> at a distance of 3 meters from the exterior surface of the radiating structure.
  - (ii) For radiated emissions above 200 GHz from field disturbance sensors and radar systems operating in the 76-81 GHz band: 1000 pW/cm<sup>2</sup> at a distance of 3 meters from the exterior surface of the radiating structure.
- (3) For field disturbance sensors and radar systems operating in the 76-81 GHz band, the spectrum shall be investigated up to 231.0 GHz.

### Test Results

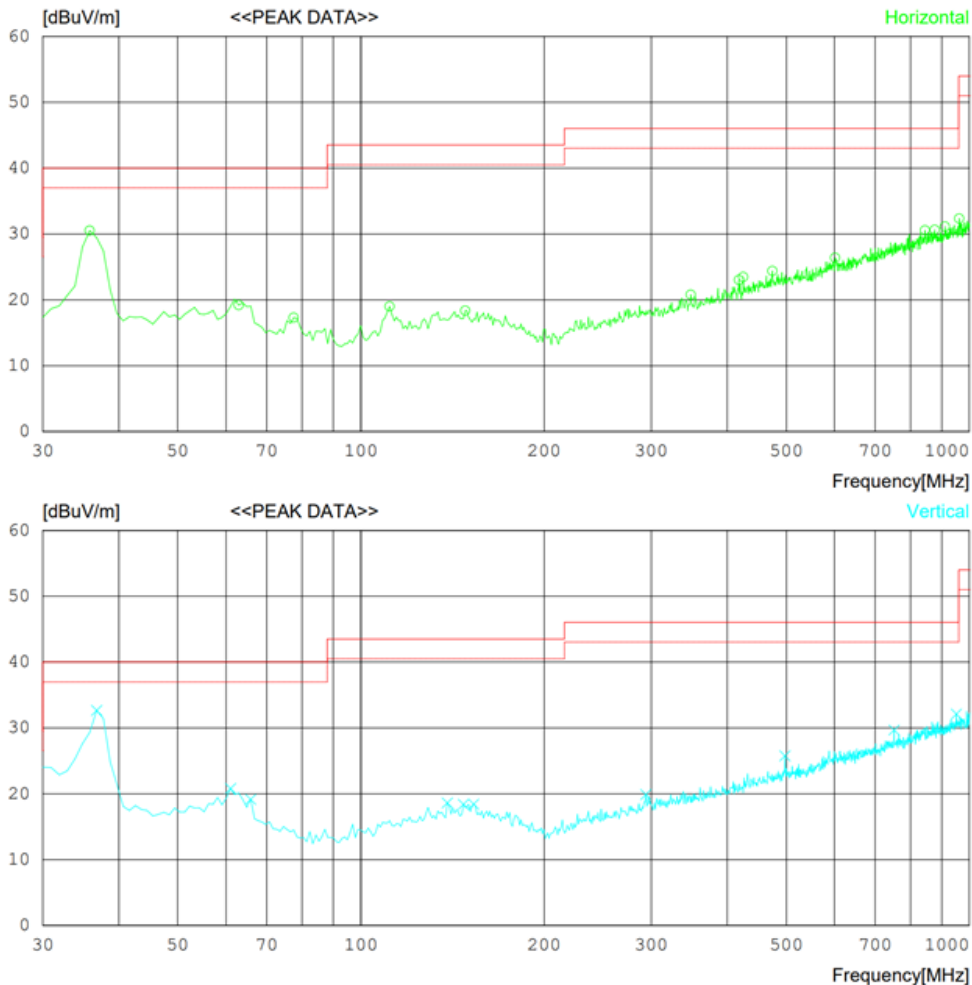
Frequency Range: 9 kHz ~ 1 GHz

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Measured Level(dBuV)	AFCLAG (dB/m)	Distance Factor(dB)	E (dBuV/m)	Limit (dBuV/m)	Margin (dB)
35.82	H	X	PK	39.80	-9.28	NA	30.52	40.0	9.48
36.79	V	X	PK	41.90	-9.25	NA	32.65	40.0	7.35
751.67	V	X	PK	24.80	4.88	NA	29.68	40.0	10.32
911.72	H	X	PK	23.50	7.66	NA	31.16	46.0	14.84

**Note.**

- No other spurious and harmonic emissions were found above listed frequencies.
- Measurements were performed using a peak detector. If peak results were meet Quasi-peak limit, Quasi-peak measurements were omitted.
- Information of Distance Factor  
 For finding emissions, measurements may be performed at a distance closer than that specified in the regulations.  
 In this case, the distance correction factor is applied to the result.  
 - Calculation of distance correction factor  
 At frequencies below 30 MHz =  $40 \log(\text{tested distance} / \text{specified distance})$   
 At frequencies at or above 30 MHz =  $20 \log(\text{tested distance} / \text{specified distance})$   
 When distance factor is "N/A", the measurements were performed at the specified distance and distance factor is not applied.
- Sample Calculation.  
 Margin = Limit – Result  
 $E(\text{dBuV/m}) = \text{Measured level (dBuV)} + \text{AFCLAG}(\text{dB/m})$   
 where, E=field strength / AFCLAG = Antenna Factor(dB/m) + Cable Loss(dB) – Amp Gain(dB)

**Worst data plot (Measured Level), X axis**



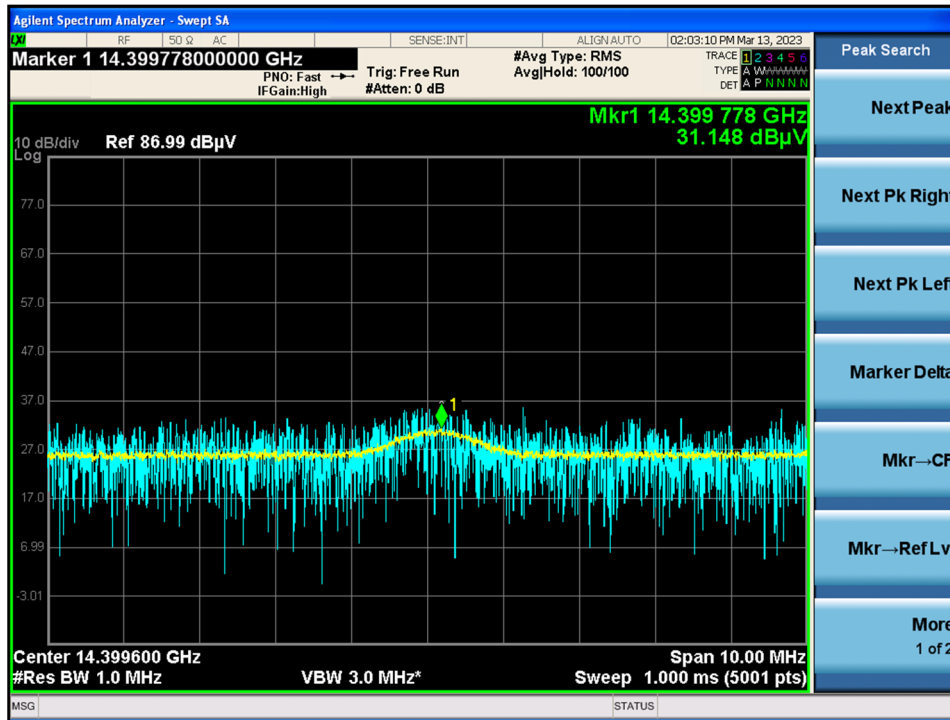
**Frequency Range: 1 ~ 40 GHz**

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Measured Level(dBuV)	AFCLAG (dB/m)	Distance Factor(dB)	E (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1 374.95	H	X	PK	44.85	-1.41	NA	43.44	74.00	30.56
1 374.91	H	X	AV	37.24	-1.41	NA	35.83	54.00	18.17
4 999.90	H	X	PK	42.79	8.45	NA	51.24	74.00	22.76
5 000.06	H	X	AV	35.47	8.45	NA	43.92	54.00	10.08
14 399.81	H	Z	PK	38.76	20.91	NA	59.67	74.00	14.33
14 399.78	H	Z	AV	31.15	20.91	NA	52.06	54.00	1.94
19 249.71	H	Z	PK	69.55	7.31	-6.02	70.84	74.00	3.16
19 262.30	H	Z	AV	31.00	7.33	-6.02	32.31	54.00	21.69
28 799.58	H	Y	PK	48.73	10.07	-6.02	52.78	74.00	21.22
28 799.45	H	Y	AV	44.03	10.07	-6.02	48.08	54.00	5.92

**Note.**

- No other spurious and harmonic emissions were found above listed frequencies.
- Information of Distance Factor  
 For finding emissions, the test distance might be reduced. In this case, the distance factor is applied to the result.  
 - Calculation of distance factor =  $20 \log(\text{applied distance} / \text{required distance})$   
 When distance factor is "N/A", the distance is 3 m and distance factor is not applied.
- Sample Calculation.  
 $\text{Margin} = \text{Limit} - \text{Result}$   
 $E(\text{dBuV/m}) = \text{Measured level (dBuV)} + \text{AFCLAG}(\text{dB/m})$   
 where, E=field strength / AFCLAG = Antenna Factor(dB/m) + Cable Loss(dB) – Amp Gain(dB)
- \* Noise floor.

**Worst data plot (Measured Level), Z axis & Hor**





**Frequency Range: 40 ~ 243 GHz**

Measurement distance(D)	Frequency (MHz)	ANT Pol	EUT Axis	Measured Level (dBm)	AFCLAG (dB/m)	E (dBuV/m)	EIRP (dBm)	Power Density (pW/cm <sup>2</sup> )	Limit (pW/cm <sup>2</sup> )
1.6 m	43 199.29	H	X	-54.45	-0.69	51.86	-48.86	0.01	600.00
1.6 m	57 598.85	V	Z	-45.04	-0.27	61.69	-39.03	0.11	600.00
1.4 m	*68 113.34	H	Z	-68.64	30.83	69.19	-32.69	0.48	600.00
1.4 m	*75 823.00	H	Z	-64.43	27.61	70.18	-31.70	0.60	600.00
1.4 m	*83 905.29	H	Z	-62.48	34.95	79.47	-22.41	5.08	600.00
1 m	*116 097.72	H	Z	-79.64	46.01	73.37	-31.43	0.64	600.00
0.8 m	*151 211.97	H	Z	-74.01	51.13	84.12	-22.62	4.84	600.00
0.8 m	*219 461.26	H	Z	-80.07	52.32	79.25	-27.49	1.58	1 000.00
0.5 m	*221 543.84	H	Z	-69.65	55.25	92.60	-18.22	13.32	1 000.00

**Note.**

1. The radiated emissions were investigated up to 243GHz. And no other spurious and harmonic emissions were found above listed frequencies.

2. Sample Calculation.

$$E(\text{dBuV/m}) = \text{Measured level (dBm)} + 107 + \text{AFCLAG}(\text{dB/m})$$

The mixer loss was applied to the measured level by SA correction factor.

where, E=field strength / AFCLAG = Antenna Factor(dB/m) + Cable Loss(dB) – Amp Gain(dB)

EIRP(dBm) = E(dBuV/m) + 20log(D) - 104.8; where, D is measurement distance (in the far field region) in m.

$$PD = \text{EIRP}_{\text{Linear}} / 4\pi d^2$$

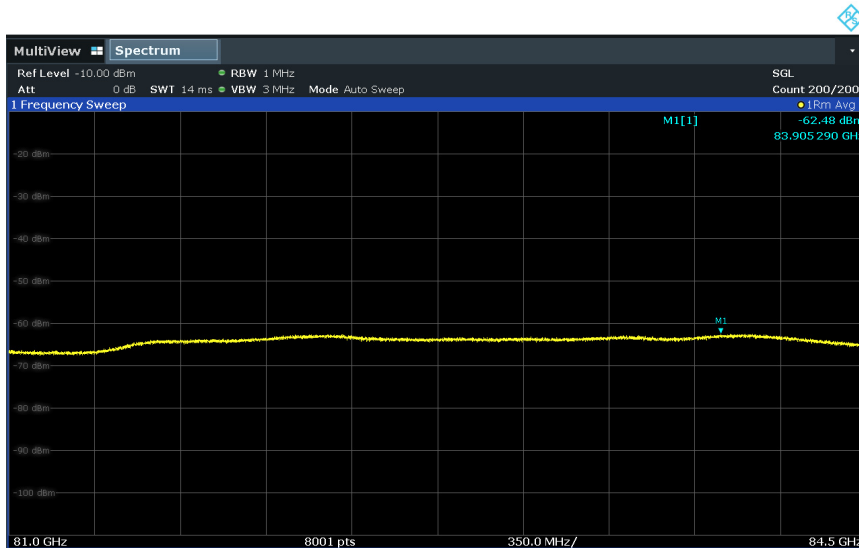
Where, PD = the power density at the distance specified by the limit, in W/m<sup>2</sup>

$$\text{EIRP}_{\text{Linear}} = \text{EIRP, in watts}$$

D = is the distance at which the power density limit is specified, in m

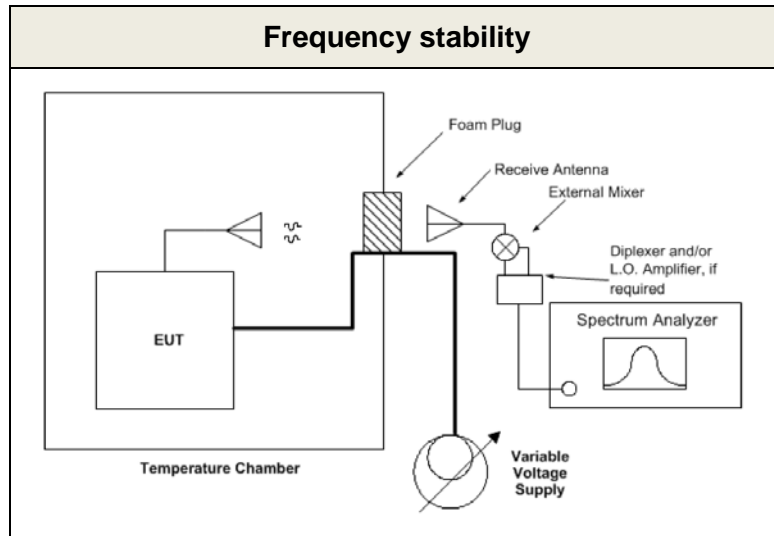
3. \* Noise floor

**Worst data plot (Measured Level), Z axis & Hor**



## 4.4 FREQUENCY STABILITY

### Test configuration



### Test Procedure

#### - ANSI C63.26-2015 – Section 5.6

The frequency stability of the transmitter is measured by:

1. At 10 °C intervals of temperatures between -30 °C and +50 °C at the manufacturer's rated supply voltage, and
2. At +20 °C temperature and  $\pm 15\%$  supply voltage variations. If a product is specified to operate over a range of input voltage then the -15% variation is applied to the lowermost voltage and the +15% is applied to the uppermost voltage.

#### Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature.  
(20 °C to provide a reference)
2. The equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C.  
A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

### Limit

#### Part 95.3379(b)

Fundamental emissions must be contained within the frequency bands specified in Part 95(M) during all conditions of operation. Equipment is presumed to operate over the temperature range  $-20$  to  $+50$  degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

### Test Results

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	Measured low frequency( $F_L$ ) (MHz)	Measured high frequency( $F_H$ ) (MHz)	Centre frequency of the OBW( $(F_L + F_H)/2$ ) (MHz)
100 %	12.00	+20(Ref)	77 187.96	78 813.82	78 000.89
100 %		-30	77 187.86	78 814.69	78 001.27
100 %		-20	77 186.45	78 814.54	78 000.49
100 %		-10	77 185.53	78 814.66	78 000.09
100 %		0	77 187.67	78 814.38	78 001.02
100 %		+10	77 187.79	78 813.82	78 000.81
100 %		+20	77 187.96	78 813.82	78 000.89
100 %		+30	77 185.41	78 813.98	77 999.70
100 %		+40	77 185.91	78 813.17	77 999.54
100 %		+50	77 185.25	78 813.69	77 999.47
115 %	13.80	+20	77 187.95	78 814.05	78 001.00
85 %	10.20	+20	77 187.90	78 814.26	78 001.08

Note: Fundamental emissions were contained within the frequency bands.

## 5 LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal. Date (yy/mm/dd)	S/N
Signal Analyzer	Rohde Schwarz	FSW85	22/12/16	23/12/16	101530
Spectrum Analyzer	KEYSIGHT	N9030B	22/12/16	23/12/16	MY55480168
Spectrum Analyzer	Agilent Technologies	N9020A	22/06/24	23/06/24	US47360812
DC Power Supply	SM techno	SDP30-5D	22/06/24	23/06/24	305DNF079
DC Power Supply	SM techno	SDP30-5D	22/06/24	23/06/24	305DMG304
Digital Multimeter	FLUKE	17B+	22/12/16	23/12/16	36390701WS
Thermohygrometer	XIAOMI	MHO-C201	22/12/16	23/12/16	00089675
Thermohygrometer	BODYCOM	BJ5478	22/12/16	23/12/16	120612-2
Temp & Humi Test Chamber	ESPEC	LHU-123	22/09/15	23/09/15	1012008111
Signal Generator	ANRITSU	MG3695C	22/12/16	23/12/16	173501
Signal Generator	KEYSIGHT	N5182B	22/12/16	23/12/16	MY53050182
Loop Antenna	ETS-Lindgren	6502	22/12/16	24/12/16	00226186
BILOG ANTENNA	Schwarzbeck	VULB 9160	22/12/16	23/12/16	3362
PreAmplifier	H.P	8447D	22/12/16	23/12/16	2944A07774
PreAmplifier	Agilent Technologies	8449B	22/06/24	23/06/24	3008A02108
PreAmplifier	tsj	MLA-1840-J02-45	22/06/24	23/06/24	16966-10728
*PreAmplifier	Norden Millimeter Inc.	NA4060G50N8P12	22/12/16	24/12/16	1003
*PreAmplifier	Norden Millimeter Inc.	NN6090G40N5P-2	22/12/16	24/12/16	1001
Level setting Attenuator	SAGE Millimeter	STA-30-12-M3-2	22/12/16	23/12/16	10391-01
Horn Antenna	ETS-Lindgren	3117	22/12/16	23/12/16	00140394
Horn Antenna	A.H. Systems Inc.	SAS-574	22/06/24	23/06/24	155
Horn Antenna	MI Wave	RX ANT-5 261U+410U	22/06/24	23/06/24	108
Horn Antenna	MI Wave	RX ANT-7 261E	22/06/24	23/06/24	112
Horn Antenna	MI Wave	261W-25/387	22/06/24	23/06/24	743
Horn Antenna	MI Wave	RX ANT-8 261F	22/06/24	23/06/24	114
Horn Antenna	MI Wave	RX ANT-9 261G	22/06/24	23/06/24	116
Horn Antenna	SAGE Millimeter	SAR-2507-03-S2	22/07/04	23/07/04	14614-01
*Harmonic Mixers	KEYSIGHT	261W-25/387	22/06/24	23/06/24	743
Harmonic Mixers	Rohde Schwarz	FS-Z90	22/08/04	23/08/04	101714
Harmonic Mixers	Rohde Schwarz	FS-Z140	22/08/04	23/08/04	101009
Harmonic Mixers	Rohde Schwarz	FS-Z220	21/10/07	23/10/07	101012
Harmonic Mixers	Rohde Schwarz	FS-Z325	22/06/27	23/06/27	100925
Cable	HUBER+SUHNER	SUCOFLEX100	23/01/04	24/01/04	M-1
Cable	HUBER+SUHNER	SUCOFLEX100	23/01/04	24/01/04	M-2
Cable	Junkosah	MWX241/B	23/01/04	24/01/04	M-3
Cable	Junkosah	MWX221	23/01/04	24/01/04	M-4
Cable	Junkosah	MWX221	23/01/04	24/01/04	M-5
Cable	DTNC	Cable	23/01/04	24/01/04	M-6
Cable	JUNFLON	J12J101757-00	23/01/04	24/01/04	M-7
Cable	HUBER+SUHNER	SUCOFLEX104	23/01/04	24/01/04	M-8
Cable	HUBER+SUHNER	SUCOFLEX106	23/01/04	24/01/04	M-9
Cable	Junkosha	MWX241	23/01/03	24/01/03	mmW-1
Cable	Junkosha	MWX342	23/01/03	24/01/03	mmW-4
Cable	Junkosha	MWX261	23/01/03	24/01/03	mmW-6
Cable	HUBER+SUHNER	SUCOFLEX 104	23/01/03	24/01/03	mmW-8
Cable	HUBER+SUHNER	SUCOFLEX 104	23/01/03	24/01/03	mmW-9
Cable	SAGE MILLIMETER Inc	SCW-1M1M024-F1	23/01/03	24/01/03	mmW-10
Test Software	tsj	Radiated Emission Measurement	NA	NA	Version 2.00.0177

Note1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017.

Note2: The cable is not a regular calibration item, so it has been calibrated by Dt&C itself.

Note3: \* The mm-wave instruments were calibrated by the manufacturer.