ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Applicant:	Precor Incorporated 20031 142nd Ave NE, Woodinville , WA 98072, USA
Manufacturer:	Quanta Computer Inc. No. 188, Wenhua 2nd Road, Guishan District, Taoyuan City 33377, Taiwan
Product Name:	Precor console
Brand Name:	Precor
Model No.:	P84, P94
Model Difference:	LCD panel difference, LCD panel size (P84:15.6”, P94: 21.5”)
Report Number:	TERF2304000942E2
FCC ID	SZNPRCR304233
IC:	7156A-PRCR304233
Date of EUT Received:	April 20, 2023
Date of Test:	April 21, 2023～April 27, 2023
Issue Date:	June 21, 2023

Approved By _____
Jay Lin

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 §15.225, 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
TERF2304000942E2	00	Original.	June 21, 2023	Tiffany Kao	

Note:

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

2、Variant information of model numbers is provided by the applicant, test results of this report are applicable to the sample EUT(s) received. and spot check is performed to demonstrate compliance for the variant.

Table of Contents

1 GENERAL INFORMATION

1.1 Product Description

Product Name:	Precor console
Brand Name:	Precor
Model No.:	P84, P94
Model Difference:	LCD panel difference, LCD panel size (P84:15.6”, P94: 21.5”)
Hardware Version:	N/A
Firmware Version:	N/A
EUT Series No.:	TE_SP_20230403308
Power Supply:	12V
Test Software (Name/Version)	Default

1.2 RF specification

Radio Technology:	NFC
Operating Frequency	13.56MHz
Transmit Power	11.14dBuV/m at 30m.
Number of Channels	1
Modulation Type	ASK
Antenna Type	Loop Antenna

Note: Antenna information is provided by the applicant.

1.3 Test Methodology

FCC Part 15, Subpart C §15.225

RSS-210 issue 10 December 2019

RSS-Gen, Issue 5 April 2018

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 is no other accessory attached. This is the worst case condition.

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.

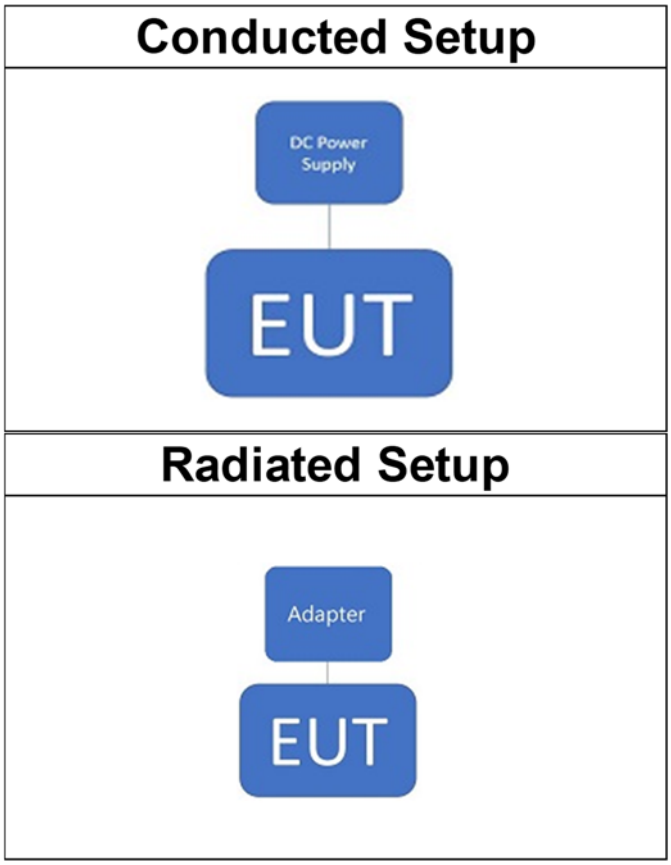
2.3.2 Radiated Emissions

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.

2.3.3 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 Test Configuration



2.5 Control Unit(s)

N/A

3 SUMMARY OF TEST RESULTS

FCC Rules	ISED Rules	Description Of Test	Result
§15.207	RSS-Gen § 8.8	AC Power Line Conducted Emission	Compliant
§15.225 (a)-(d)	RSS210 Annex B B.6 (a)	Radiated Emission	Compliant
§15.209	RSS-Gen § 8.9	Radiated Emission Limits, general requirement	Compliant
§15.225 (e)	RSS210 Annex B B.6 (b)	Frequency Stability	Compliant
§2.1049 §15.215 (c)	RSS-Gen § 6.7	Emission Bandwidth	Compliant
§15.203	N/A	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

4.1 The Worst Test Modes and Channel Details

1. The EUT stay in continuous transmission mode.
2. The frequency 13.56 MHz is the default channel to test, where it is the only manipulative channel as this application supports.
3. Only one configuration is supported/applicable as follows.

RADIATED EMISSION TEST			
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION
NFC	1	1	ASK
FREQUENCY STABILITY			
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION
NFC	1	1	ASK
20dB BANDWIDTH			
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION
NFC	1	1	ASK

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.

5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty		
AC Power Line Conducted Emission	+/-	2.32	dB
Frequency Stability	+/-	1.53	Hz
Emission Bandwidth	+/-	1.53	Hz
Temperature	+/-	0.7	°C
Humidity	+/-	3	%
DC / AC Power Source	+/-	1	%

Radiated Spurious Emission Measurement Uncertainty				
Polarization: Vertical	**+/-**	**2.8**	**dB**	9kHz~30MHz
	+/-	**4.82**	**dB**	30MHz - 1000MHz
	+/-	**4.37**	**dB**	1GHz - 18GHz
	+/-	**4.21**	**dB**	18GHz - 40GHz
Polarization: Horizontal	**+/-**	**2.8**	**dB**	9kHz~30MHz
	+/-	**4.54**	**dB**	30MHz - 1000MHz
	+/-	**4.37**	**dB**	1GHz - 18GHz
	+/-	**4.21**	**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

AC Power-Line Conducted Emission Test Site: Conduction C					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
LISN	SCHWARZBECK	NSLK8127	973	04/20/2023	04/19/2024
EMI Test Receiver	R&S	ESCI	101342	04/25/2023	04/24/2024
Coaxial Cable	EC Lab	RF-HY-CAB-250	RF-HY-CAB-250-01	03/27/2023	03/26/2024
Pulse Limiter	EC Lab	VTSD 9561F-N	485	03/27/2023	03/26/2024
Test Software	audix	e3	E3 20923 SGS Ver.9 (C)	N.C.R	N.C.R

6.2 Conducted Measurement

Conducted Emission Test Site: Conducted D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
H-Loop Near Field Antenna	LANGER EMV-Technik	LF-R 400	02-1597	N.C.R	N.C.R
Spectrum Analyzer	KEYSIGHT	N9010B	MY60240506	06/08/2022	06/07/2023
Temperature Chamber	TERCHY	MHK-120LK	1020582	06/21/2022	06/20/2023
DC Power Supply	Gwinstek	SPS-3610	GEV856767	09/29/2022	09/28/2023
DC Block	PASTERNACK	PE8210	RF156	11/16/2022	11/15/2023

6.3 Radiated Measurement

Radiated Emission Test Site: SAC G					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Broadband Antenna	SCHWARZBECK	VULB 9168	1208	07/07/2022	07/06/2023
Loop Antenna	ETS.LINDGREN	6502	148045	10/05/2022	10/04/2023
3m Site NSA	SGS	966 chamber G	N/A	03/30/2023	03/29/2024
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	07/13/2022	07/12/2023
Test Software	audix	e3	E3 20923 SGS Ver.9 (C)	N.C.R	N.C.R
Pre-Amplifier	EMC Instruments	EMC330N	980781	03/15/2023	03/14/2024
Coaxial Cable	EMC Instruments	EMCCFD400-NM-NM-8000-5000-2000	210216、210217、210218	03/15/2023	03/14/2024

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

7 CONDUCTED EMISSIONS TEST

7.1 Standard Applicable

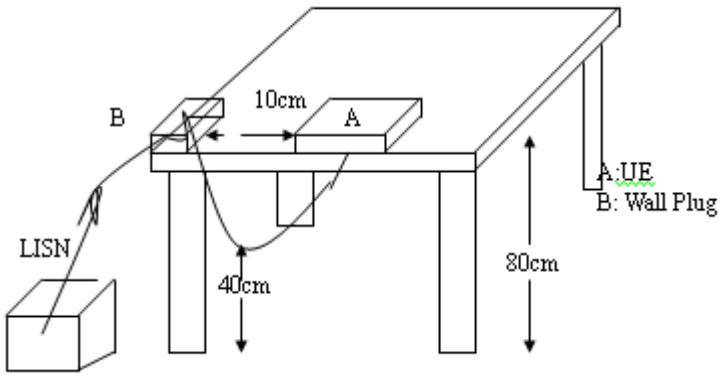
Frequency within 150 kHz to 30MHz shall not exceed the limit table as below.

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 (Block Diagram of Configuration)



7.4 Measurement Procedure

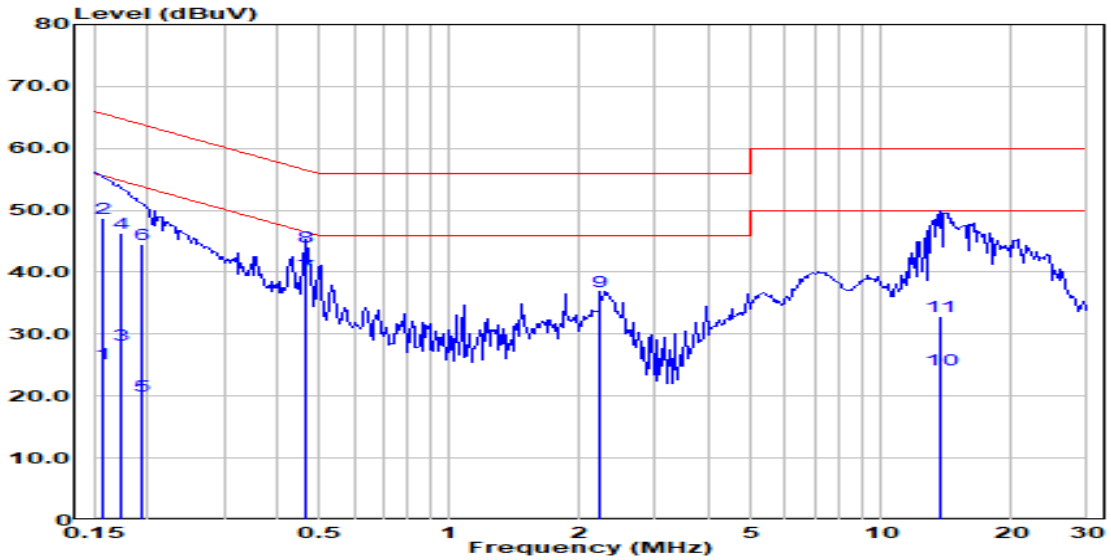
1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

7.5 Measurement Result

Note: Refer to next page for measurement data and plots.
Note2: The * reveals the worst-case results that closest to the limit.

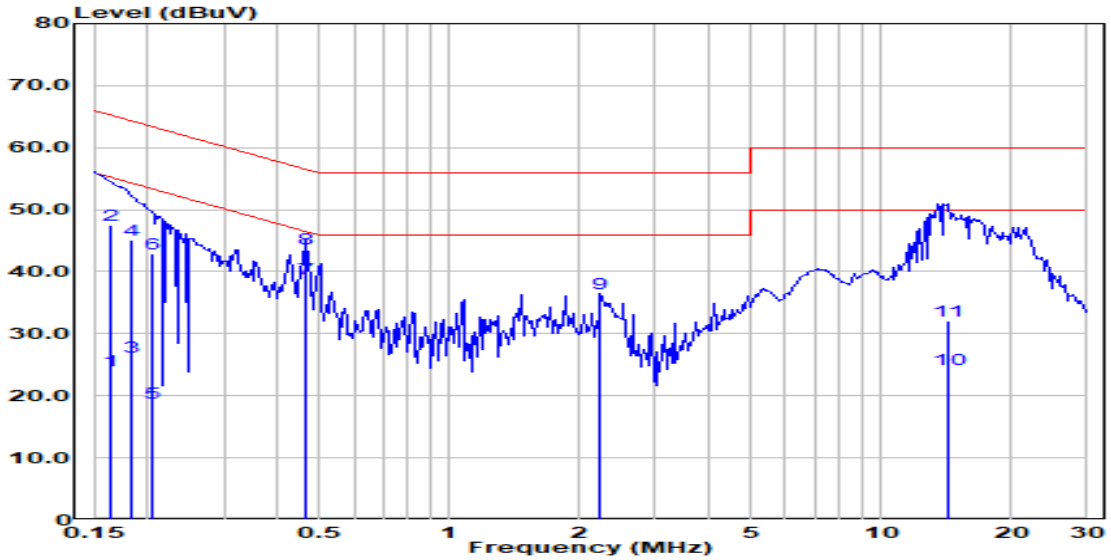
AC POWER LINE CONDUCTED EMISSION TEST DATA

Report Number	:TERF2304000942E2	Test Site	:Conduction C
Test Mode	:NFC	Test Date	:2023-05-23
Power	:120/60Hz	Temp./Hum.	:22.6/60
Probe	:L1	Engineer	:Temo Chen



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.156	Average	15.00	10.32	25.32	55.65	-30.33
0.156	QP	38.50	10.32	48.82	65.65	-16.83
0.174	Average	17.90	10.31	28.21	54.77	-26.55
0.174	QP	36.10	10.31	46.41	64.77	-18.35
0.193	Average	9.80	10.31	20.11	53.89	-33.78
0.193	QP	34.10	10.31	44.41	63.89	-19.48
0.466	Average	29.20	10.33	39.53	46.58	-7.05
0.466	QP	33.80	10.33	44.13	56.58	-12.45
2.237	Peak	25.79	11.09	36.88	56.00	-19.12
13.695	Average	13.60	10.70	24.30	50.00	-25.70
13.695	QP	22.10	10.70	32.80	60.00	-27.20

Report Number	:TERF2304000942E2	Test Site	:Conduction C
Test Mode	:NFC	Test Date	:2023-05-23
Power	:120/60Hz	Temp./Hum.	:22.6/60
Probe	:N	Engineer	:Temo Chen

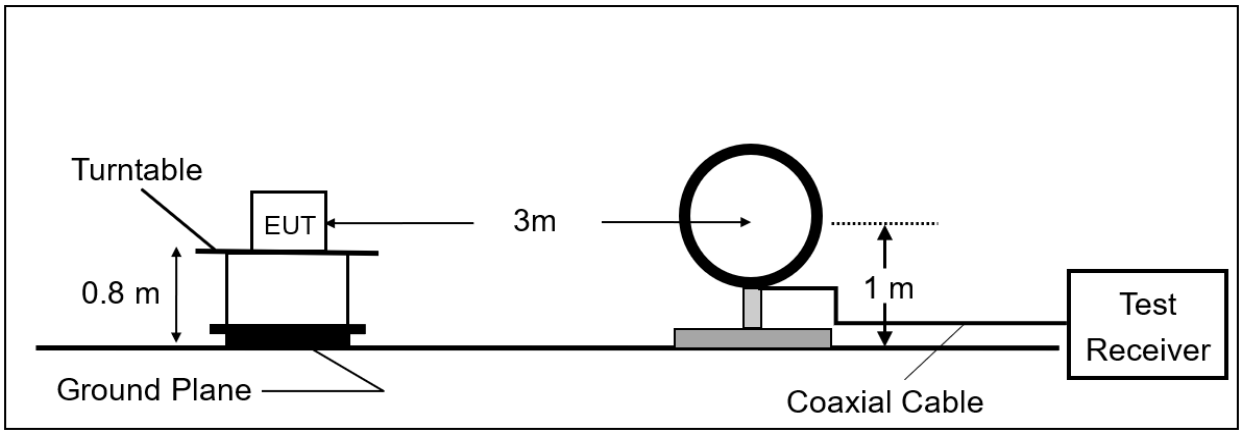


Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.163	Average	13.70	10.30	24.00	55.30	-31.30
0.163	QP	37.30	10.30	47.60	65.30	-17.70
0.183	Average	15.90	10.30	26.20	54.33	-28.13
0.183	QP	34.80	10.30	45.10	64.33	-19.23
0.204	Average	8.60	10.30	18.90	53.45	-34.55
0.204	QP	32.70	10.30	43.00	63.45	-20.45
0.466	Average	28.50	10.31	38.81	46.58	-7.77
0.466	QP	33.30	10.31	43.61	56.58	-12.97
2.237	Peak	25.39	11.08	36.47	56.00	-19.53
14.288	Average	13.50	10.77	24.27	50.00	-25.73
14.288	QP	21.30	10.77	32.07	60.00	-27.93

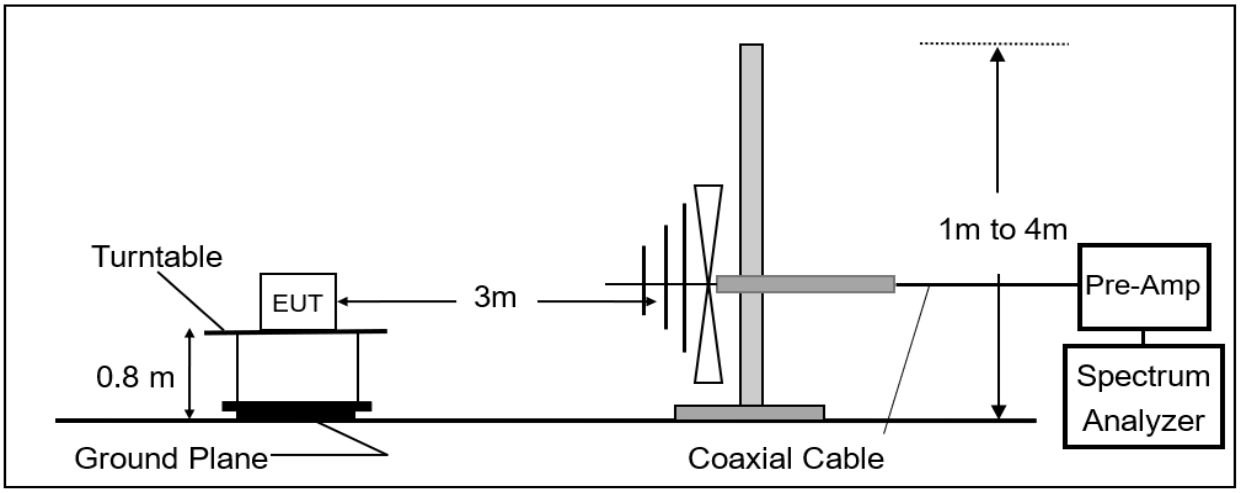
8 RADIATED EMISSION TEST

8.1 Test SET-UP (Block Diagram of Configuration)

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



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



8.2 Measurement Procedure

1. Configure the EUT according to ANSI C63.10.
2. The EUT was placed on a turn table which is 0.8m above ground plane and been measured in the frequency range between 0.009MHz to 30MHz and 30MHz to 1GHz.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission.
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 default test channel measured were complete.

8.3 Field Strength Calculation

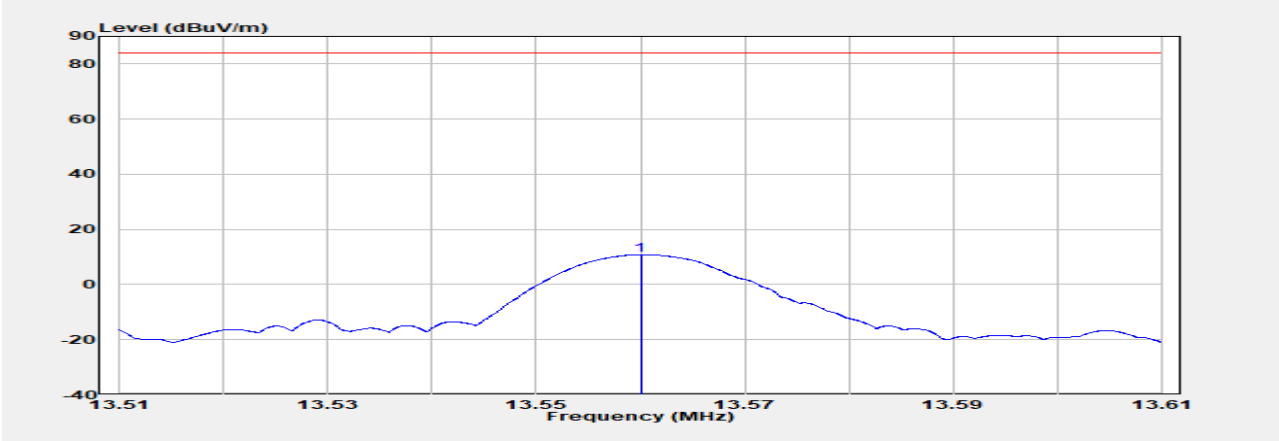
The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

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

8.4 Field Strength of Fundamental Emission

Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0/67
Test Mode	:Main	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Temo Chen



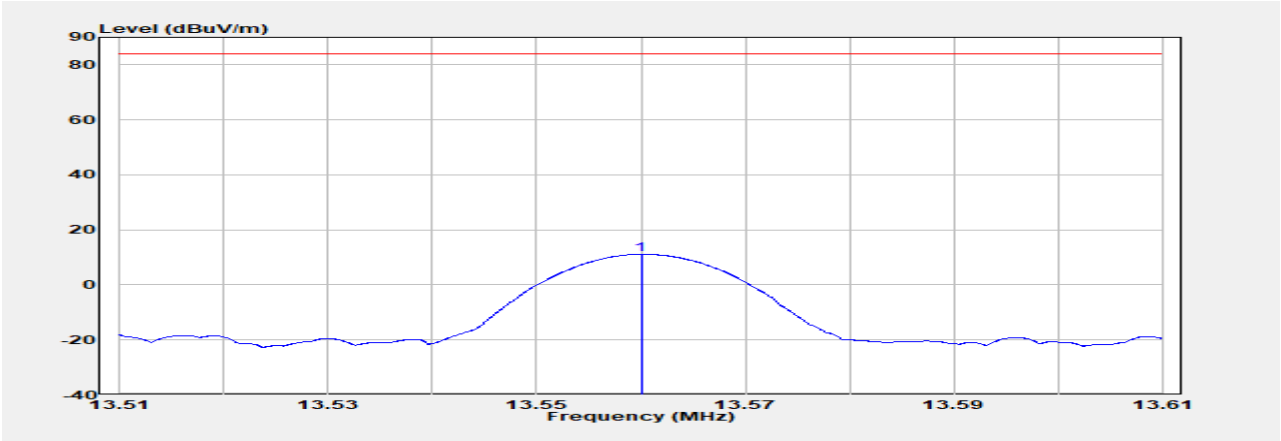
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
13.560	Peak	39.04	-28.20	10.84	84.00	-73.16

Actual level = Reading level + Factor
Factor = Antenna factor + cable loss – Pre_Amplifier Gain – distance factor

Test distance= 3m

For Actual level and limit:
Field strength (dBuV/m) at 300m, within the band 9 kHz - 490 kHz.
Field strength (dBuV/m) at 30m, within the band 490 kHz - 30 MHz.

Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0/67
Test Mode	:Main	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Temo Chen



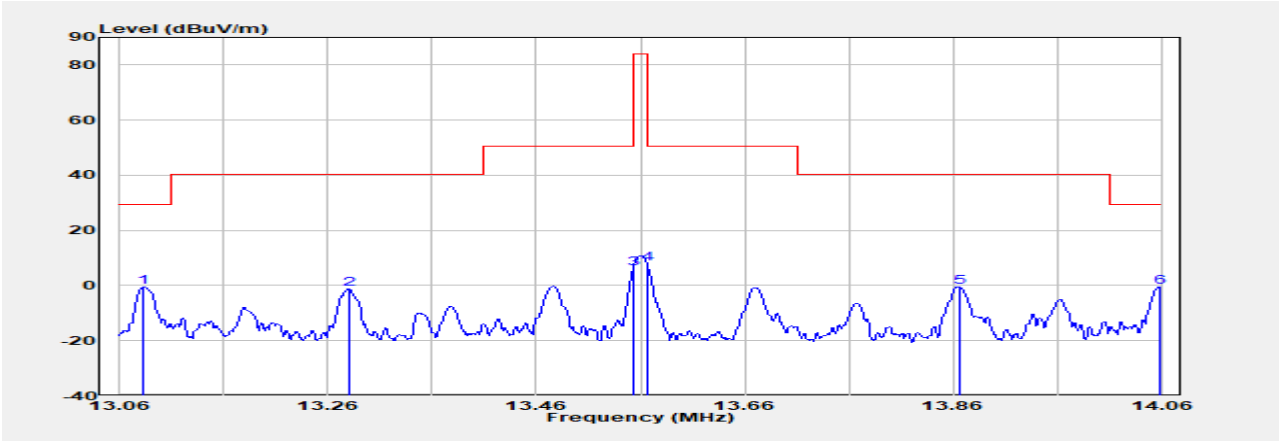
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
13.560	Peak	39.34	-28.20	11.14	84.00	-72.86

Actual level = Reading level + Factor
Factor = Antenna factor + cable loss – Pre_Amplifier Gain — distance factor

Test distance= 3m

For Actual level and limit:
Field strength (dBuV/m) at 300m, within the band 9 kHz - 490 kHz.
Field strength (dBuV/m) at 30m, within the band 490 kHz - 30 MHz.

Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0/67
Test Mode	:Mask	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Temo Chen



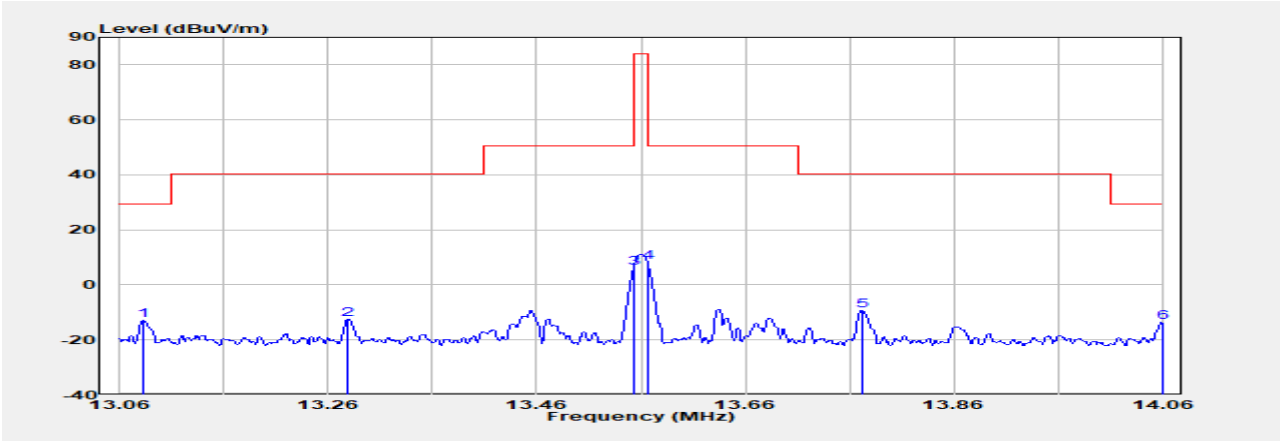
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
13.083	Peak	27.58	-28.17	-0.59	29.54	-30.13
13.280	Peak	26.88	-28.18	-1.31	40.50	-41.81
13.553	Peak	34.22	-28.20	6.01	50.47	-44.46
13.566	Peak	36.13	-28.20	7.93	84.00	-76.07
13.866	Peak	27.75	-28.23	-0.48	40.50	-40.98
14.058	Peak	27.63	-28.24	-0.61	29.54	-30.15

Actual level = Reading level + Factor
Factor = Antenna factor + cable loss – Pre_Amplifier Gain – distance factor

Test distance= 3m

For Actual level and limit:
Field strength (dBuV/m) at 300m, within the band 9 kHz - 490 kHz.
Field strength (dBuV/m) at 30m, within the band 490 kHz - 30 MHz.

Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0/67
Test Mode	:Mask	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Temo Chen



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
13.083	Peak	15.22	-28.17	-12.95	29.54	-42.49
13.279	Peak	15.74	-28.18	-12.45	40.50	-52.95
13.553	Peak	34.37	-28.20	6.17	50.47	-44.30
13.566	Peak	36.43	-28.20	8.22	84.00	-75.78
13.772	Peak	18.88	-28.22	-9.34	40.50	-49.84
14.060	Peak	14.64	-28.24	-13.59	29.54	-43.13

Actual level = Reading level + Factor
Factor = Antenna factor + cable loss – Pre_Amplifier Gain — distance factor

Test distance= 3m

For Actual level and limit:
Field strength (dBuV/m) at 300m, within the band 9 kHz - 490 kHz.
Field strength (dBuV/m) at 30m, within the band 490 kHz - 30 MHz.

8.4.1 Applicable standard

Rules and specifiactions	CFR 47 Part 15 section 15.225(a)-(d)	
Frequency of Emission (MHz)	Field Strength (μV/m)at 30m	Field Strength (dBμV/m)at 30m
1.705~13.110	30	29.5
13.110~13.410	106	40.5
13.410~13.553	334	50.5
13.553~13.567	15848	84
13.567~13.710	334	50.5
13.710~14.010	106	40.5
14.010~30.00	30	29.5

Radiated Mask per ISED RSS 210 Annex B B6

(a) 15.848 millivolts/m (84 dBμV/m) at 30 m, within the band 13.553-13.567 MHz.

(b) 334 microvolts/m (50.5 dBμV/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz.

(c) 106 microvolts/m (40.5 dBμV/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz.

(d) RSS-Gen general field strength limits for frequencies outside the band 13.110-14.010 MHz

8.4.2 Distance Extrapolation Factor

30m to 3m

Distance extrapolation = 40 *log (30/3) = 40 dB

30m to 10m

Distance extrapolation = 40 *log (30/10) = 19.08 dB

10m to 3m

Distance extrapolation = 40 *log (10/3) = 20.92 dB

Note:

1. Distance extrapolation factor = 40 log (required distance/ test distance) (dB)
2. The lower limit shall apply at the transition frequencies.
3. KDB 414788 D01 OATS and 3m semi-anechoic chamber Justification:
   Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. OATS and 3m SAC chamber testing had been performed and 3m SAC measured test result is the worst case test result.

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

Below 30 MHz of Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Distance Factor (dB)

Above 30 MHz of Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amp Gain (dB)

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

8.4.3 Field Strength of Fundamental Emission Measurement Result

8.5 Radiated Spurious Emission Measurement

8.5.1 Standard Applicable

The field strength of any emissions appearing outside of the 13.110-14.010 MHz shall not exceed the general radiated emission limits as below.

Frequency (MHz)	Field strength (μV/m)	Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

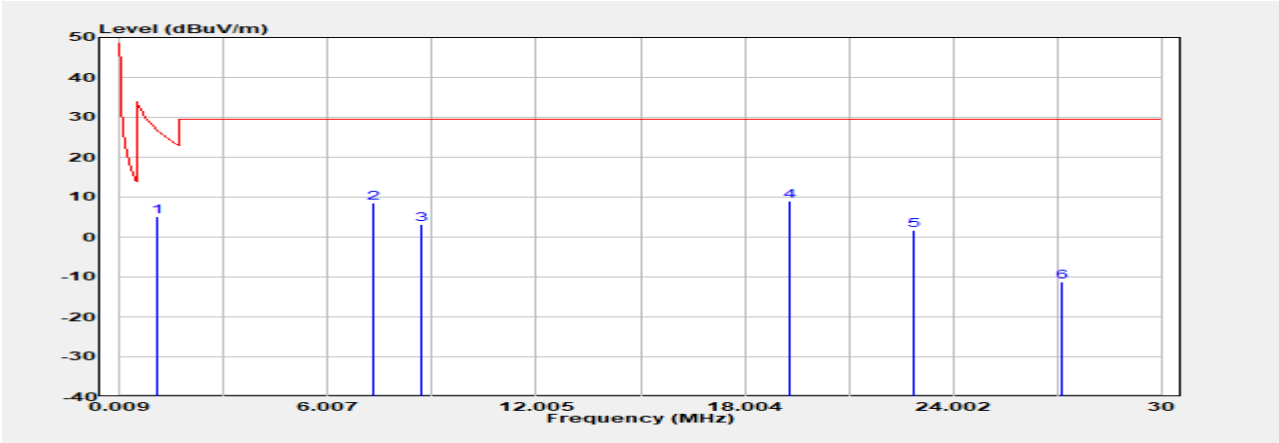
Note:

1. Emission level in dBμV/m=20 log (μV/m)
2. Distance extrapolation factor = 40 log (required distance/ test distance) (dB)
3. 20*log(30uV/m) = 29.54 dBuV/m
4. The lower limit shall apply at the transition frequencies.
5. The measurement was undertaken in closer distance at 3m, where extrapolation factor is offset to convert the limit of the measurement.
6. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of §15.205 and RSS-Gen §8.10.
7. The general radiated emission limits in §15.209 and RSS-Gen §8.9 apply for the spurious emission generate from UE, except for the fundamental emission where the respective section specifies otherwise.

8.5.2 Radiated Spurious Emission Measurement Result

P84

Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0/67
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Temo Chen



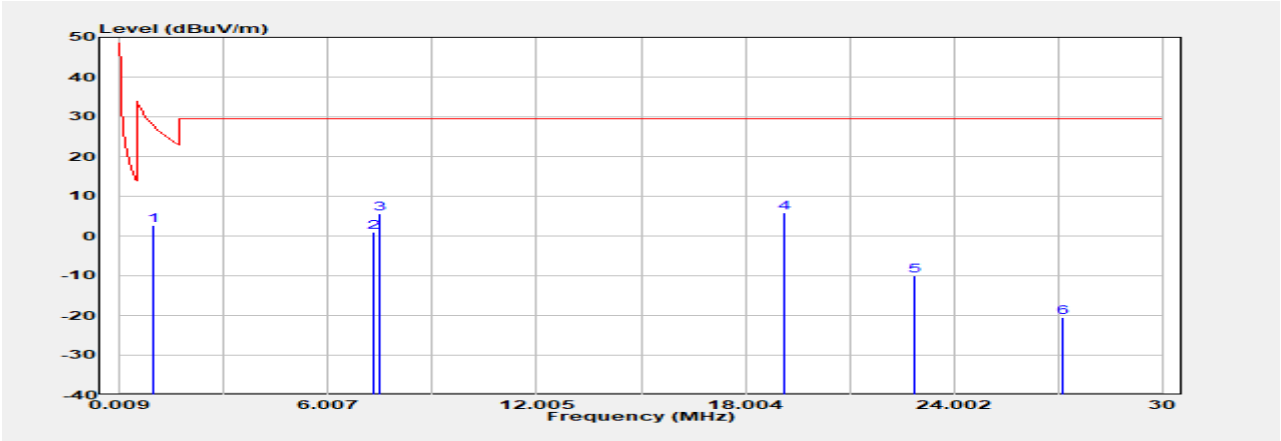
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
1.059	Peak	33.74	-28.73	5.00	27.11	-22.11
7.327	Peak	36.80	-28.38	8.42	29.54	-21.12
8.676	Peak	31.24	-28.12	3.12	29.54	-26.42
19.323	Peak	37.63	-28.56	9.08	29.54	-20.46
22.862	Peak	30.92	-29.19	1.74	29.54	-27.80
27.120	Peak	18.74	-29.94	-11.21	29.54	-40.75

Actual level = Reading level + Factor
Factor = Antenna factor + cable loss – Pre_Amplifier Gain – distance factor

Test distance= 3m

For Actual level and limit:
Field strength (dBuV/m) at 300m, within the band 9 kHz - 490 kHz.
Field strength (dBuV/m) at 30m, within the band 490 kHz - 30 MHz.

Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0/67
Test Mode	:Tx	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Temo Chen



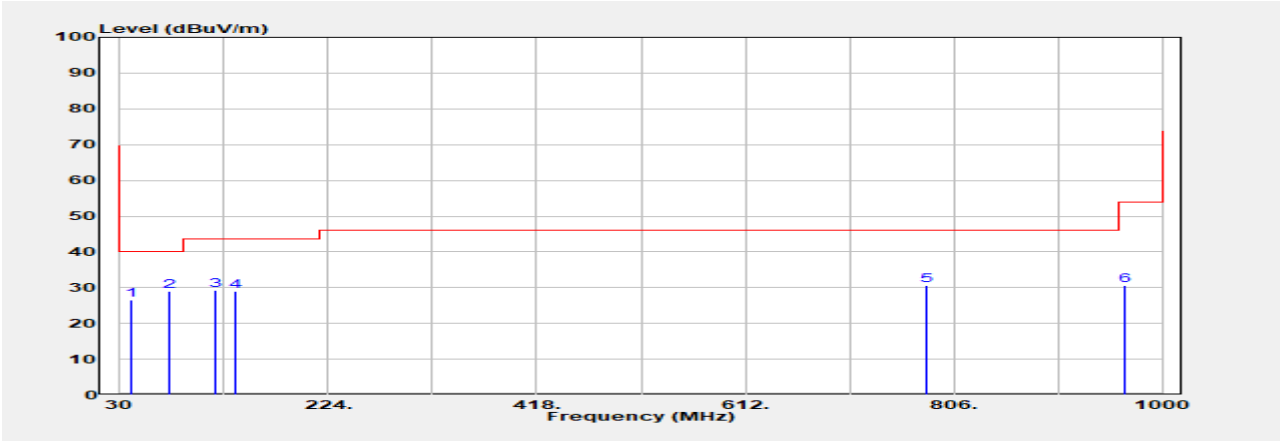
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
0.969	Peak	31.30	-28.72	2.58	27.88	-25.30
7.327	Peak	29.47	-28.38	1.08	29.54	-28.46
7.507	Peak	33.89	-28.35	5.55	29.54	-23.99
19.143	Peak	34.39	-28.55	5.85	29.54	-23.69
22.862	Peak	19.07	-29.19	-10.12	29.54	-39.66
27.120	Peak	9.46	-29.94	-20.48	29.54	-50.02

Actual level = Reading level + Factor
Factor = Antenna factor + cable loss – Pre_Amplifier Gain – distance factor

Test distance= 3m

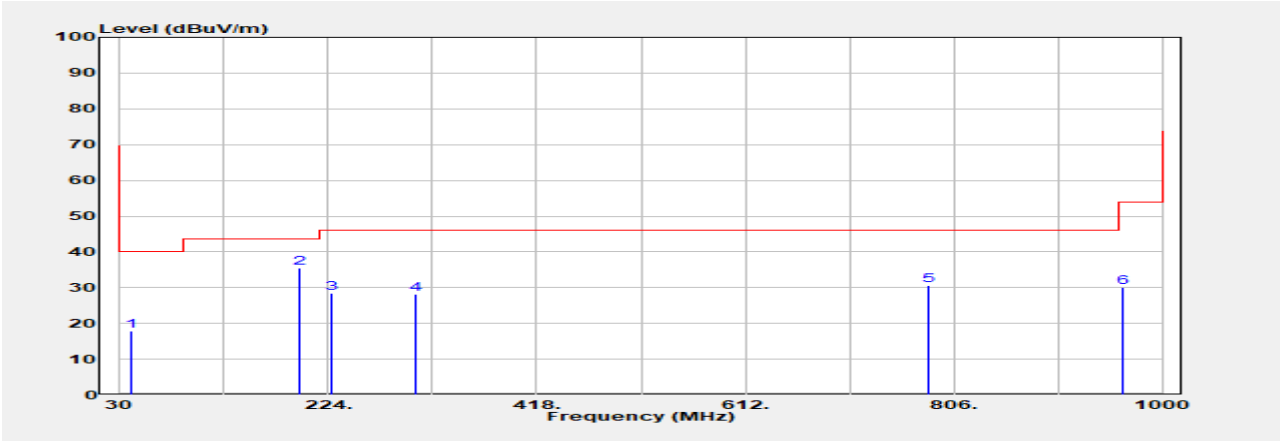
For Actual level and limit:
Field strength (dBuV/m) at 300m, within the band 9 kHz - 490 kHz.
Field strength (dBuV/m) at 30m, within the band 490 kHz - 30 MHz.

Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0/67
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Temo Chen



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
40.680	Peak	40.02	-13.44	26.58	40.00	-13.42
76.560	Peak	45.51	-16.61	28.90	40.00	-11.10
118.270	Peak	44.73	-15.50	29.23	43.50	-14.27
136.700	Peak	42.81	-13.81	28.99	43.50	-14.51
780.780	Peak	32.30	-1.77	30.53	46.00	-15.47
965.080	Peak	29.86	0.88	30.74	54.00	-23.26

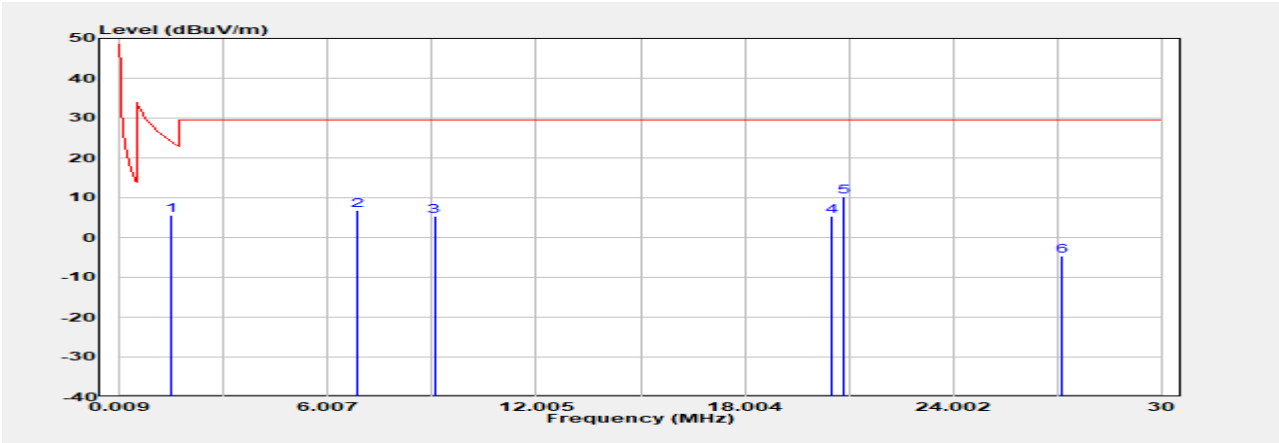
Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0/67
Test Mode	:Tx	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Temo Chen



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
40.680	Peak	31.33	-13.44	17.88	40.00	-22.12
196.840	Peak	51.11	-15.73	35.39	43.50	-8.11
226.910	Peak	44.26	-15.73	28.52	46.00	-17.48
305.480	Peak	40.34	-12.05	28.29	46.00	-17.71
781.750	Peak	32.36	-1.79	30.57	46.00	-15.43
963.140	Peak	29.27	0.87	30.14	54.00	-23.86

P94

Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0°C/67%
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Temo Chen



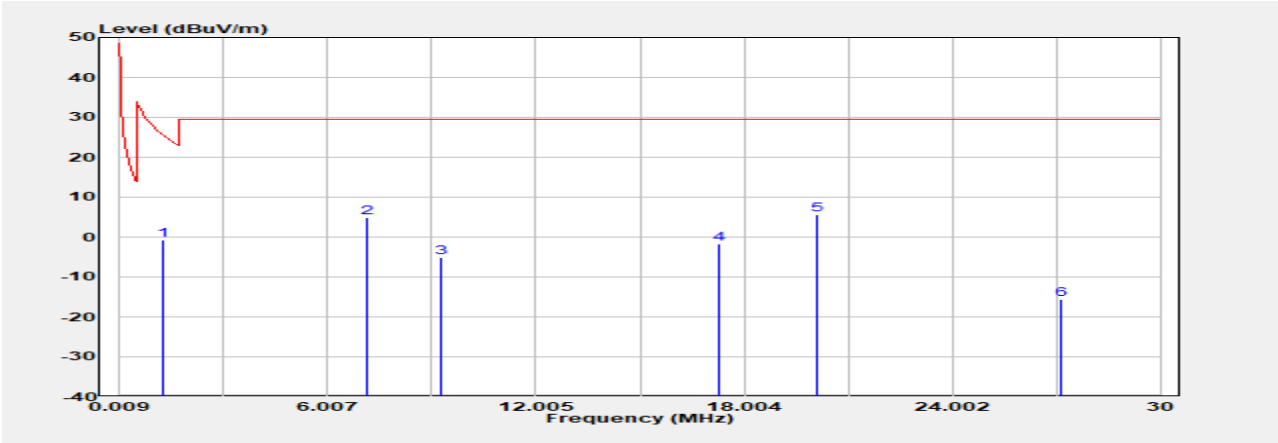
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
1.479	Peak	34.44	-28.81	5.63	24.21	-18.58
6.847	Peak	35.28	-28.49	6.79	29.54	-22.75
9.066	Peak	33.51	-28.05	5.45	29.54	-24.09
20.493	Peak	34.10	-28.70	5.40	29.54	-24.14
20.883	Peak	39.10	-28.78	10.32	29.54	-19.22
27.120	Peak	25.22	-29.94	-4.73	29.54	-34.27

Actual level = Reading level + Factor
Factor = Antenna factor + cable loss – Pre_Amplifier Gain – distance factor

Test distance= 3m

For Actual level and limit:
Field strength (dBuV/m) at 300m, within the band 9 kHz - 490 kHz.
Field strength (dBuV/m) at 30m, within the band 490 kHz - 30 MHz.

Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0°C/67%
Test Mode	:Tx	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Temo Chen



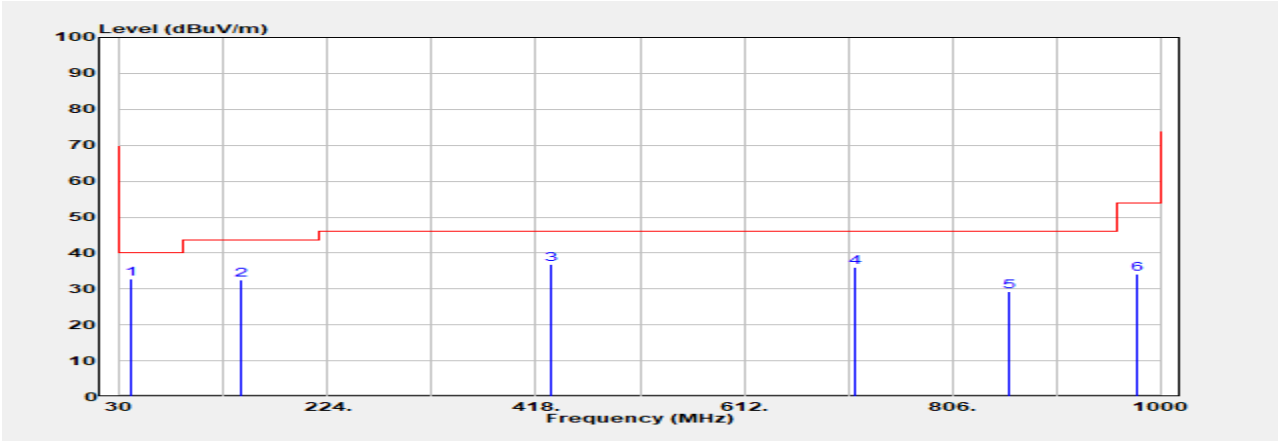
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
1.269	Peak	28.00	-28.78	-0.77	25.54	-26.32
7.117	Peak	33.27	-28.43	4.84	29.54	-24.70
9.276	Peak	22.85	-28.02	-5.17	29.54	-34.71
17.284	Peak	26.85	-28.44	-1.60	29.54	-31.14
20.103	Peak	34.34	-28.61	5.73	29.54	-23.81
27.120	Peak	14.34	-29.94	-15.61	29.54	-45.15

Actual level = Reading level + Factor
Factor = Antenna factor + cable loss – Pre_Amplifier Gain – distance factor

Test distance= 3m

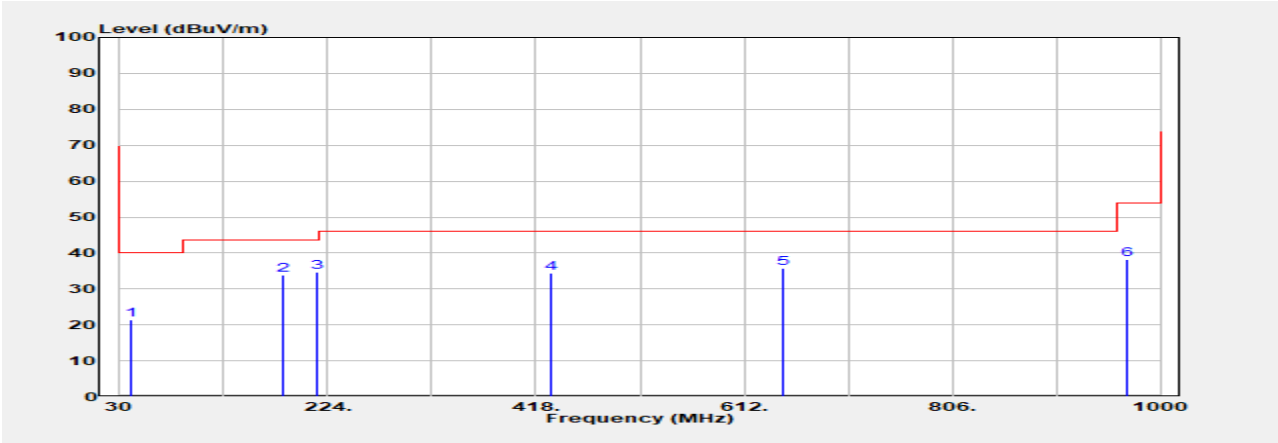
For Actual level and limit:
Field strength (dBuV/m) at 300m, within the band 9 kHz - 490 kHz.
Field strength (dBuV/m) at 30m, within the band 490 kHz - 30 MHz.

Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0°C/67%
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Temo Chen



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
40.680	Peak	46.18	-13.44	32.74	40.00	-7.26
143.490	Peak	45.62	-13.07	32.55	43.50	-10.95
432.550	QP	45.59	-8.73	36.86	46.00	-9.14
715.790	Peak	39.60	-3.46	36.13	46.00	-9.87
859.350	QP	30.50	-1.23	29.27	46.00	-16.73
978.660	Peak	33.24	0.83	34.07	54.00	-19.93

Report Number	:TERF2304000942E2	Test Site	:SAC G Chamber
Operation Mode	:NFC	Test Date	:2023-05-23
Test Frequency	:13.56 MHz	Temp./Humi.	:22.0°C/67%
Test Mode	:Tx	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Temo Chen



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
40.680	Peak	34.94	-13.44	21.50	40.00	-18.50
181.320	Peak	48.38	-14.61	33.77	43.50	-9.73
214.300	Peak	50.69	-15.98	34.72	43.50	-8.78
432.550	Peak	43.20	-8.73	34.47	46.00	-11.53
647.890	Peak	40.20	-4.52	35.67	46.00	-10.33
968.960	Peak	37.21	0.91	38.12	54.00	-15.88

9 FREQUENCY STABILITY

9.1 Applicable Standard

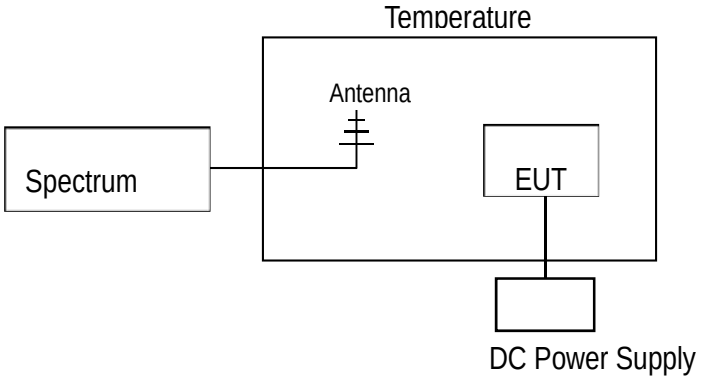
The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Carrier frequency stability shall be maintained to ±0.01% (±100 ppm).
For licence-exempt radio apparatus, the frequency stability shall be measured at temperatures of -20°C (-4°F), +20°C (+68°F) and +50°C (+122°F).

9.2 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 10kHz, Span =100kHz.
4. Set SPA Max hold. Mark peak.

9.3 Test SET-UP (Block Diagram of Configuration)



9.4 Measurement Results

Startup

A. Temperature Variation

Power Supply	Environment	Frequency	Delta (kHz)	Limit (kHz)
Vdc	Temperature (℃)	(MHz)		
12	-20	13.55919	-0.81000	+/- 1.356
12	-10	13.55916	-0.84000	+/- 1.356
12	0	13.55934	-0.66000	+/- 1.356
12	10	13.55983	-0.17000	+/- 1.356
12	20	13.55977	-0.23000	+/- 1.356
12	30	13.55927	-0.73000	+/- 1.356
12	40	13.55959	-0.41000	+/- 1.356
12	50	13.55948	-0.52000	+/- 1.356

B. Supply Voltage Variation

Power Supply	Environment	Frequency	Delta (kHz)	Limit (kHz)
Vdc	Temperature (℃)	(MHz)		
13.8	20	13.55987	-0.13000	+/- 1.356
12	20	13.55997	-0.03000	+/- 1.356
10.2	20	13.55961	-0.39000	+/- 1.356

2 minutes

A. Temperature Variation

Power Supply	Environment	Frequency	Delta (kHz)	Limit (kHz)
Vdc	Temperature (℃)	(MHz)		
12	-20	13.55913	-0.87000	+/- 1.356
12	-10	13.55941	-0.59000	+/- 1.356
12	0	13.55903	-0.97000	+/- 1.356
12	10	13.55970	-0.30000	+/- 1.356
12	20	13.55981	-0.19000	+/- 1.356
12	30	13.55998	-0.02000	+/- 1.356
12	40	13.55970	-0.30000	+/- 1.356
12	50	13.55943	-0.57000	+/- 1.356

B. Supply Voltage Variation

Power Supply	Environment	Frequency	Delta (kHz)	Limit (kHz)
Vdc	Temperature (℃)	(MHz)		
13.8	20	13.55945	-0.55000	+/- 1.356
12	20	13.55998	-0.02000	+/- 1.356
10.2	20	13.55924	-0.76000	+/- 1.356

5 minutes

A. Temperature Variation

Power Supply	Environment	Frequency	Delta (kHz)	Limit (kHz)
Vdc	Temperature (℃)	(MHz)		
12	-20	13.55995	-0.05000	+/- 1.356
12	-10	13.55905	-0.95000	+/- 1.356
12	0	13.55978	-0.22000	+/- 1.356
12	10	13.55921	-0.79000	+/- 1.356
12	20	13.55985	-0.15000	+/- 1.356
12	30	13.55945	-0.55000	+/- 1.356
12	40	13.55991	-0.09000	+/- 1.356
12	50	13.55905	-0.95000	+/- 1.356

B. Supply Voltage Variation

Power Supply	Environment	Frequency	Delta (kHz)	Limit (kHz)
Vdc	Temperature (℃)	(MHz)		
13.8	20	13.55962	-0.38000	+/- 1.356
12	20	13.55946	-0.54000	+/- 1.356
10.2	20	13.55945	-0.55000	+/- 1.356

10 minutes

A. Temperature Variation

Power Supply	Environment	Frequency	Delta (kHz)	Limit (kHz)
Vdc	Temperature (℃)	(MHz)		
12	-20	13.55981	-0.19000	+/- 1.356
12	-10	13.55922	-0.78000	+/- 1.356
12	0	13.55986	-0.14000	+/- 1.356
12	10	13.55921	-0.79000	+/- 1.356
12	20	13.55987	-0.13000	+/- 1.356
12	30	13.5596	-0.40000	+/- 1.356
12	40	13.55917	-0.83000	+/- 1.356
12	50	13.55952	-0.48000	+/- 1.356

B. Supply Voltage Variation

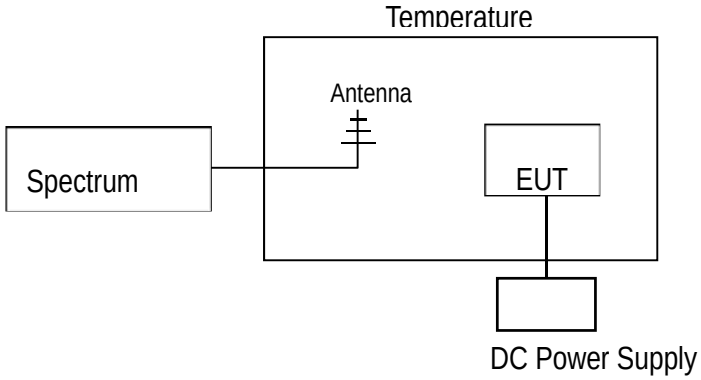
Power Supply	Environment	Frequency	Delta (kHz)	Limit (kHz)
Vdc	Temperature (℃)	(MHz)		
13.8	20	13.55975	-0.25000	+/- 1.356
12	20	13.56002	0.02000	+/- 1.356
10.2	20	13.55923	-0.77000	+/- 1.356

10 EMISSION BANDWIDTH MEASUREMENT

10.1 Applicable Standard:

The 20 dB and 99% bandwidth shall be specified in operating frequency band.

10.2 Test Set-up



10.3 Measurement Procedure

1. Placed the EUT on the testing table.
2. Set the EUT under transmission condition continuously at specific channel frequency.
3. The resolution bandwidth of 1 kHz and the video bandwidth of 3 kHz were used.
4. Measured the spectrum width with power higher than 20dB below carrier.

10.4 Measurement Result

FCC

20dB BW (kHz)
2.701

Opration range	Frequency (MHz)	Limit (MHz)
Low	13.55880	>13.11
High	13.56125	<14.01

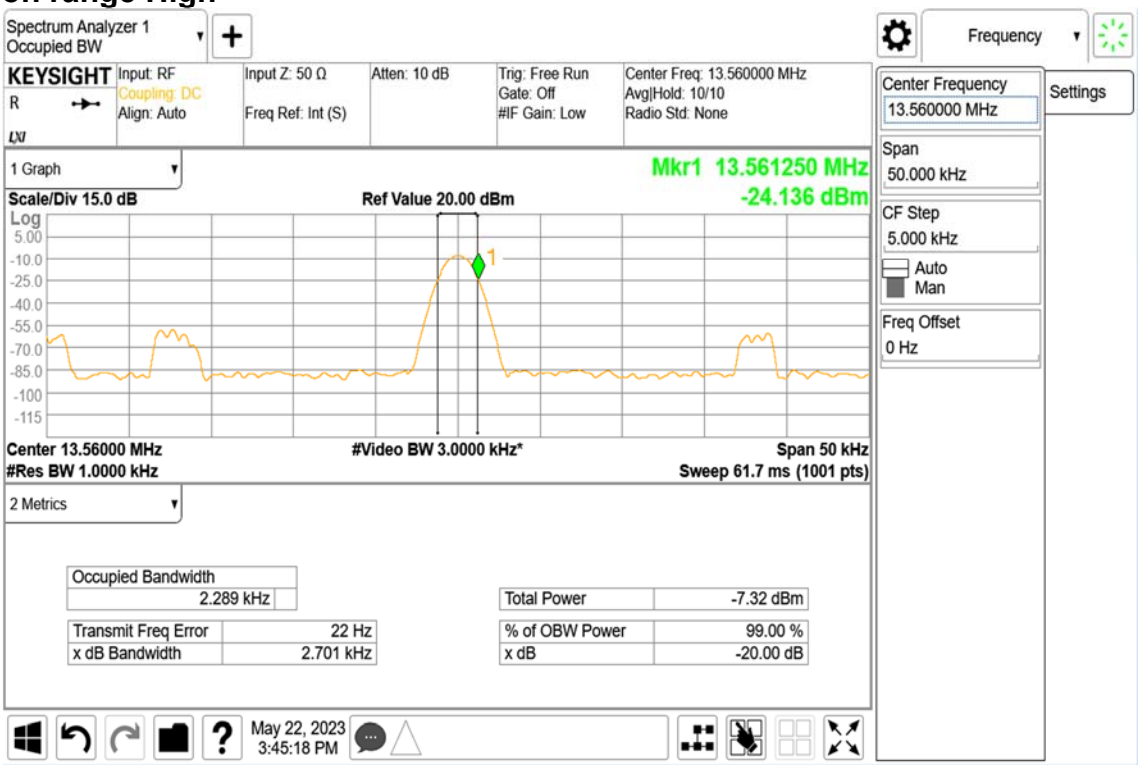
IC

99% BW (kHz)
2.289

Bandwidth

Operation range low

Operation range High



11 ANTENNA REQUIREMENT

11.1 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.

11.2 Antenna Connected Construction:

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

~ End of Report ~