

Report No.: KSCR220300041301

Page: 1 of 43

# TEST REPORT

Application No.: KSCR2203000413AT FCC ID: 2AXVM-TP4X-3XXX IC: 26572-HMTP4X

Applicant: Hangzhou Microimage Software Co., Ltd.

Address of Applicant: Room 313, Unit B, Building 2, 399 Danfeng Road, Xixing Subdistrict,

Binjiang District, Hangzhou, Zhejiang

**Manufacturer:** Hangzhou Microimage Software Co., Ltd.

Address of Manufacturer: Room 313, Unit B, Building 2, 399 Danfeng Road, Xixing Subdistrict,

Binjiang District, Hangzhou, Zhejiang

Factory: Hangzhou Microimage Intelligent Technology Co., Ltd.

Address of Factory: Floor 2, Building A1, 299 Qiushi Road, Tonglu Economic Development

Zone, Tonglu County, Hangzhou City, Zhejiang Province

**Equipment Under Test (EUT):** 

**EUT Name:** Pocket Thermography Camera

Model No.: HM-TP42-3AQF/W-Pocket2,HM-TP41-3AQF-Pocket1,

HM-TP41-3AQF/W-Pocket1¤

please refer to section 2 of this report which indicates which model was

actually tested and which were electrically identical.

Trade Mark: HIKMICRO

Standard(s): 47 CFR Part 15, Subpart C 15.247

RSS-247 Issue 2, February 2017

RSS-Gen Issue 5 Amendment 2 (February 2021)

**Date of Receipt:** 2022-03-30

**Date of Test:** 2022-04-14 to 2022-04-14

**Date of Issue:** 2022-05-12

Test Result: Pass\*

Eric Lin EMC Laboratory Manager

Jose Sin



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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



Report No.: KSCR220300041301

Page: 2 of 43

	Revision Record					
Version Chapter Date Mod				Remark		
01		2022-05-12		Original		

Authorized for issue by:		
	Tommie Tang	
	Tommie Tang/Project Engineer	-
	Eria fri	
	Eric Lin/Reviewer	-



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Report No.: KSCR220300041301

Page: 3 of 43

# 2 Test Summary

Radio Spectrum Technical Requirement							
Item	FCC Requirement	IC Requirement	Method	Result			
Antenna Requirement	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	RSS-Gen Clause 6.8	N/A	Customer Declaration			

N/A: Not applicable

Radio Spectrum Matter Part						
Item	FCC Requirement	IC Requirement	Method	Result		
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass		
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247a(2)	RSS-247 Clause 5.2(a)	ANSI C63.10 (2013) Section 11.8.1	Pass		
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247(b)(3)	RSS-247 Clause 5.4(d)	ANSI C63.10 (2013) Section 11.9.1	Pass		
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247(e)	RSS-247 Clause 5.2(b)	ANSI C63.10 (2013) Section 11.10.3	Pass		
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Clause 5.5	ANSI C63.10 (2013) Section 11.13.3.2	Pass		
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Clause 5.5	ANSI C63.10 (2013) Section 11.11	Pass		
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.10.5	Pass		
Radiated Spurious Emissions Below 1GHz	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.4,6.5,6.6	Pass		
Radiated Spurious Emissions Above 1GHz	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.4,6.5,6.6	Pass		
99% Bandwidth	-	RSS-Gen Section 6.7	ANSI C63.10 Section 6.9.3	Pass		

## **Declaration of EUT Family Grouping:**

Note: There are series models mentioned in this report, and they are the identical in electrical and electronic characters. Only the model HM-TP42-3AQF/W-Pocket2 was tested since their differences were the model number and silk.



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Report No.: KSCR220300041301

Page: 4 of 43

## 3 Contents

		Pag	
1	I COVER PA	AGE	.1
2	TEST SUN	MARY	.3
_		-	
3	3 CONTENT	`S	.4
4	4 GENERAL	INFORMATION	.6
	4.1 DETA	ILS OF E.U.T.	.6
	4.2 Powe	ER LEVEL SETTING USING IN TEST:	.6
		RIPTION OF SUPPORT UNITS	
		SUREMENT UNCERTAINTY	
		LOCATION	
		FACILITY	
		ATION FROM STANDARDS	
5	5 EQUIPME	NT LIST	.9
6	S PADIO SE	PECTRUM TECHNICAL REQUIREMENT1	11
Ü			
		NNA REQUIREMENT	
		onclusion	
7		PECTRUM MATTER TEST RESULTS1	
	7.1 CONE	DUCTED EMISSIONS AT AC POWER LINE (150kHz-30MHz)1	12
		U.T. Operation1	
		st Mode Description	
		st Setup Diagram1	
		easurement Procedure and Data	
		DUCTED PEAK OUTPUT POWER	
		st Mode Description	
		st Setup Diagram	
		easurement Procedure and Data	
		1UM 6DB BANDWIDTH1	
	7.3.1 E.	U.T. Operation	18
		st Mode Description	
		st Setup Diagram1	
		easurement Procedure and Data	
		ER SPECTRUM DENSITY	
		U.T. Operation	
		st Mode Description	
		easurement Procedure and Data	
		DUCTED BAND EDGES MEASUREMENT	
		U.T. Operation	



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Report No.: KSCR220300041301

Page: 5 of 43

7.5.3 Test Setup Diagram	21 22 22
7.5.4 Measurement Procedure and Data	21 22 22
7.6 CONDUCTED SPURIOUS EMISSIONS	22
7.0 CONDUCTED SPURIOUS EINISSIONS	
7.6.1 E.U.T. Operation	22
7.6.2 Test Mode Description	
7.6.3 Test Setup Diagram	22
7.6.4 Measurement Procedure and Data	23
7.7 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS	24
7.7.1 E.U.T. Operation	24
7.7.2 Test Mode Description	24
7.7.3 Test Setup Diagram	
7.7.4 Measurement Procedure and Data	25
7.8 RADIATED SPURIOUS EMISSIONS BELOW 1GHz	
7.8.1 E.U.T. Operation	
7.8.2 Test Mode Description	
7.8.3 Test Setup Diagram	
7.8.4 Measurement Procedure and Data	
7.9 RADIATED SPURIOUS EMISSIONS ABOVE 1GHz	
7.9.1 E.U.T. Operation	
7.9.2 Test Mode Description	
7.9.3 Test Setup Diagram	
7.9.4 Measurement Procedure and Data	
7.10 99% BANDWIDTH	
7.10.1 E.U.T. Operation	
7.10.2 Test Mode Description	
7.10.3 Test Setup Diagram	
7.10.4 Measurement Procedure and Data	42
TEST SETUP PHOTO	43
EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS)	43



8

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Report No.: KSCR220300041301

Page: 6 of 43

## 4 General Information

### 4.1 Details of E.U.T.

Power supply:	DC 3.85V by rechargeable Li-on polymer battery or DC 5V,2A by adapter		
	Battery Model: HM-3821DC		
	Rated Voltage: 3.85V		
	Rated Capacity: 2100mAh/8.085Wh		
	Nominal Capacity: 2150mAh/8.2775Wh		
	Limited Charge Voltage: 4.4V		
Operation Frequency:	2402MHz to 2480MHz		
Bluetooth Version:	V5.0 Dual mode		
Modulation Type:	GFSK		
Data Rate:	1Mbps		
Number of Channels:	40		
Channel Spacing:	2MHz		
Antenna Type:	2.88dBi (Provided by manufacturer)		
Antenna Gain:	FPC antenna		
S/N:	J26470855		
Firmware Version:	V5.5.24_220301		

## 4.2 Power level setting using in test:

Channel	BLE
0	Default
19	Default
39	Default

## 4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
SecureCRT	VanDyke	V 6.2.0	1
Notebook	LENOVO	K27	EB24537645
Serial port adapter plate	1	1	1
Switching adapter	SHENZHEN HONOR ELECTRONIC CO., LTD	ADS-12EA-05 05010E	1



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Report No.: KSCR220300041301

Page: 7 of 43

## 4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty	
1	Radio Frequency	8.4 x 10 <sup>-8</sup>	
2	Timeout	2s	
3	Duty Cycle	0.37%	
4	Occupied Bandwidth	3%	
5	RF Conducted Power	0.6dB	
6	RF Power Density	2.9dB	
7	Conducted Spurious Emissions	0.75dB	
0	DE Dadiete d Davier	5.2dB (Below 1GHz)	
8	RF Radiated Power	5.9dB (Above 1GHz)	
		4.2dB (Below 30MHz)	
	D # 4 10 1	4.5dB (30MHz-1GHz)	
9	Radiated Spurious Emission Test	5.1dB (1GHz-18GHz)	
		5.4dB (Above 18GHz)	
10	Temperature Test	1°C	
11	Humidity Test	3%	
12	Supply Voltages	1.5%	
13	Time	3%	

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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Report No.: KSCR220300041301

Page: 8 of 43

#### 4.5 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

### 4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### • CNAS (No. CNAS L4354)

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

### • A2LA (Certificate No. 2541.01)

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

### • FCC (Designation Number: CN1172)

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

### • ISED (CAB identifier: CN0072)

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E
• VCCI (Member No.: 1938)

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

### 4.7 Deviation from Standards

None

#### 4.8 Abnormalities from Standard Conditions

None



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Page: 9 of 43

# 5 Equipment List

Item	Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal. Due Date
Con	ducted Emission at Mains Terminals (150	kHz-30MHz)				
1	EMI Test Receive	R&S	ESCI	100781	01/22/2022	01/21/2023
2	LISN	R&S	ENV216	101604	10/12/2021	10/11/2022
3	LISN	Schwarzbeck	NNLK 8129	8129-143	10/12/2021	10/11/2022
4	Pulse Limiter	R&S	ESH3-Z2	100609	01/22/2022	01/21/2023
5	CE test Cable	Thermax	/	14	10/16/2021	10/15/2022
6	Test Software	Faratronic	EZ-EMC	CCS-03A1	N.C.R	N.C.R
RF (	Conducted Test					
1	Spectrum Analyzer	Agilent	E4446A	MY44020154	04/16/2021	04/15/2022
2	Spectrum Analyzer	Keysight	N9020A	MY55370209	10/11/2021	10/10/2022
4	Signal Generator	Agilent	N5182A	MY50142015	08/27/2021	08/26/2022
5	Spectrum Analyzer	Keysight	N9030B	MY61330164	01/22/2022	01/21/2023
6	Vector Signal Generator	R&S	SMW200A	110074	10/12/2021	10/11/2022
7	Radio Communication Test Station	Anritsu	MT8000A	6262012849	09/23/2021	09/22/2022
8	Radio Communication Analyzer	Anritsu	MT8821C	6201692222	09/23/2021	09/22/2022
9	Universal Radio Communication Tester	R&S	CMW500	159275	10/12/2021	10/11/2022
10	Universal Radio Communication Tester	R&S	CMW500	167239	04/16/2021	04/15/2022
11	Power Meter	Anritsu	ML2495A	1445010	04/15/2021	04/14/2022
12	Switcher	CCSRF	FY562	KUS2001M001-3	10/12/2021	10/11/2022
13	AC Power Source	EXTECH	6605	1570106	N.C.R	N.C.R
14	DC Power Supply	Aglient	E3632A	MY50340053	N.C.R	N.C.R
15	6dB Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R	N.C.R
16	Power Divider	AISI	IOWOPE2068	PE2068	N.C.R	N.C.R
17	Filter	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
18	Conducted Test Cable	1	RF01-RF04	1	04/15/2021	04/14/2022
19	Software	BST	TST-PASS	N/A	N/A	N/A
20	Temp. / Humidity Chamber	TERCHY	MHK-120AK	X30109	04/15/2021	04/14/2022
21	Thermometer	Anymetre	TH603	CCS007	10/14/2021	10/13/2022
RF R	adiated Test	_				
1	Spectrum Analyzer	R&S	FSV40	101493	10/11/2021	10/10/2022
2	Signal Generator	Agilent	E8257C	MY43321570	10/18/2021	10/17/2022
3	Loop Antenna	Com-Power	AL-130R	10160008	04/13/2021	04/12/2023
4	Bilog Antenna	TESEQ	CBL 6112D	35403	06/21/2021	06/20/2023
5	Bilog Antenna	SCHWARZBECK	VULB9160	9160-3342	04/13/2021	04/12/2023
6	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	267	10/26/2020	10/25/2022
7	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	00143290	02/22/2021	02/21/2023
8	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	BBHA9170171	02/20/2022	02/19/2023
9	Pre-Amplifier(30MHz~18GHz)	LNA	/	/	04/15/2021	04/14/2022
10	Amplifier(18~40GHz)	COM-POWER	PAM-840A	461332	10/18/2021	10/17/2022
11	Low Pass Filter	MICRO-TRONICS	VLFX-950	RV142900829	N.C.R	N.C.R
12	High Pass Filter	Mini-Circuits	VHF-1200	15542	N.C.R	N.C.R
13	Filter (5450MHz~5770 MHz)	MICRO-TRONICS	BRC50704-01	2	N.C.R	N.C.R
14	Filter (5690 MHz~5930 MHz)	MICRO-TRONICS	BRC50705-01	4	N.C.R	N.C.R



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Report No.: KSCR220300041301

Page: 10 of 43

15	Filter (5150 MHz~5350 MHz)	MICRO-TRONICS	BRC50703-01	2	N.C.R	N.C.R
16	Filter (885 MHz~915 MHz)	MICRO-TRONICS	BRM14698	1	N.C.R	N.C.R
17	Filter (815 MHz~860 MHz)	MICRO-TRONICS	BRM14697	1	N.C.R	N.C.R
18	Filter (1745 MHz $\sim$ 1910 MHz)	MICRO-TRONICS	BRM14700	1	N.C.R	N.C.R
19	Filter (1922 MHz $\sim$ 1977 MHz)	MICRO-TRONICS	BRM50715	1	N.C.R	N.C.R
20	Filter (2550 MHz)	MICRO-TRONICS	HPM13362	5	N.C.R	N.C.R
21	Filter (1532 MHz $\sim$ 1845 MHz)	MICRO-TRONICS	BRM50713	1	N.C.R	N.C.R
22	Filter (2.4GHz)	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
23	RE test cable	1	RE01-RE04	1	04/15/2021	04/14/2022
24	Software	Faratronic	EZ_EMC	N/A	N/A	N/A



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Report No.: KSCR220300041301

Page: 11 of 43

# 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

#### 6.1.2 Conclusion

#### Standard Requirement:

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, 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.

### 15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **EUT Antenna:**

The antenna is FPC antenna on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.88 dBi.

Antenna location: Refer to internal photo.



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Report No.: KSCR220300041301

Page: 12 of 43

# 7 Radio Spectrum Matter Test Results

## 7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207 Test Method: ANSI C63.10 (2013) Section 6.2

#### Limit:

Frequency of	Conducted limit(dBµV)				
emission(MHz)	Quasi-peak	Average			
0.15-0.5	66 to 56*	56 to 46*			
0.5-5	56	46			
5-30	60	50			
*Decreases with the logarithm of the frequency.					
Detector: Peak for pre-scan (9k	Hz resolution bandwidth) 0.15M	1 to 30MHz			

### 7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

### 7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	08	Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation.



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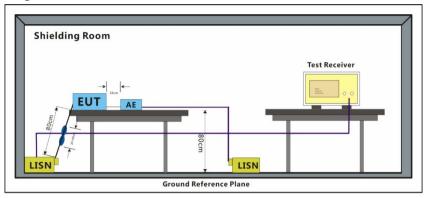
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Report No.: KSCR220300041301

Page: 13 of 43

### 7.1.3 Test Setup Diagram



#### 7.1.4 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a  $50 \text{ohm}/50 \mu\text{H} + 5 \text{ohm}$  linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: Level=Read Level+ Cable Loss+ LISN Factor



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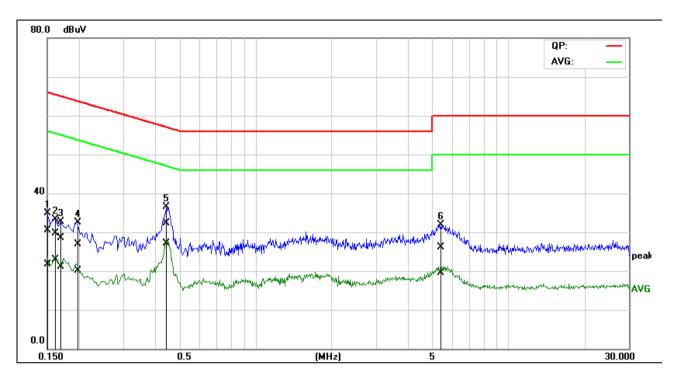
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Report No.: KSCR220300041301

Page: 14 of 43

Test Mode: 08; Line: Live line



No.	Frequen cy	QuasiPe ak reading	Average reading	Correcti on factor	QuasiPe ak result	Average result	QuasiPe ak Iimit	Average limit	QuasiPe ak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1500	11.01	2.23	19.50	30.51	21.73	65.99	56.00	-35.48	-34.27	Pass
2	0.1612	10.15	3.42	19.50	29.65	22.92	65.40	55.40	-35.75	-32.48	Pass
3	0.1686	8.95	1.63	19.50	28.45	21.13	65.02	55.03	-36.57	-33.90	Pass
4	0.1988	7.31	0.60	19.50	26.81	20.10	63.66	53.66	-36.85	-33.56	Pass
5*	0.4470	12.82	7.55	19.55	32.37	27.10	56.93	46.93	-24.56	-19.83	Pass
6	5.3991	6.24	-0.28	19.84	26.08	19.56	60.00	50.00	-33.92	-30.44	Pass



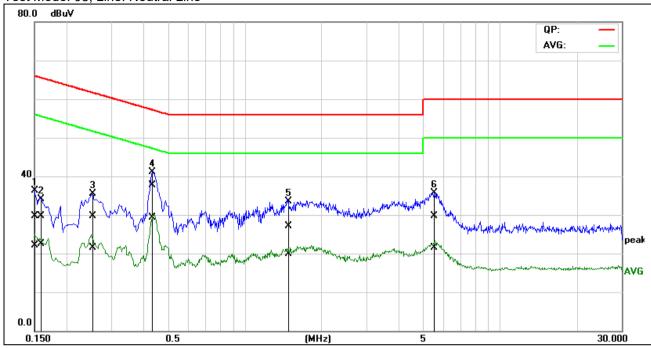
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Report No.: KSCR220300041301

Page: 15 of 43

Test Mode: 08; Line: Neutral Line



No.	Frequen cy	QuasiPe ak reading	Average reading	Correcti on factor	QuasiPe ak result	Average result	QuasiPe ak Iimit	Average limit	QuasiPe ak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1516	10.29	2.61	19.48	29.77	22.09	65.91	55.91	-36.14	-33.82	Pass
2	0.1600	10.13	2.95	19.48	29.61	22.43	65.46	55.46	-35.85	-33.03	Pass
3	0.2558	10.24	1.91	19.50	29.74	21.41	61.56	51.57	-31.82	-30.16	Pass
4*	0.4376	18.25	9.67	19.54	37.79	29.21	57.11	47.11	-19.32	-17.90	Pass
5	1.4807	7.46	0.36	19.62	27.08	19.98	56.00	46.00	-28.92	-26.02	Pass
6	5.4766	9.80	1.60	19.83	29.63	21.43	60.00	50.00	-30.37	-28.57	Pass



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Report No.: KSCR220300041301

Page: 16 of 43

## 7.2 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method: ANSI C63.10 (2013) Section 11.9.1

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
	1 for ≥50 hopping channels
902-928	0.25 for 25≤ hopping channels <50
	1 for digital modulation
	1 for ≥75 non-overlapping hopping channels
2400-2483.5	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

### 7.2.1 E.U.T. Operation

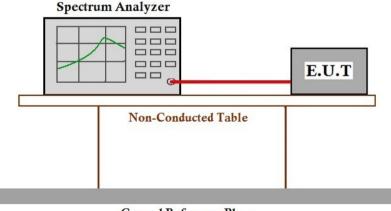
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

#### 7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description			
Final test	08	Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation.			

### 7.2.3 Test Setup Diagram



**Ground Reference Plane** 



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Report No.: KSCR220300041301

Page: 17 of 43

#### 7.2.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220300041301



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Report No.: KSCR220300041301

Page: 18 of 43

### 7.3 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1

Limit:

≥500 kHz

### 7.3.1 E.U.T. Operation

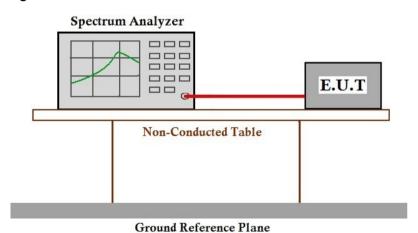
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	08	Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation.

#### 7.3.3 Test Setup Diagram



#### 7.3.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220300041301



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Report No.: KSCR220300041301

Page: 19 of 43

### 7.4 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)
Test Method: ANSI C63.10 (2013) Section 11.10.2

Limit:

≤8dBm in any 3 kHz band during any time interval of continuous transmission

### 7.4.1 E.U.T. Operation

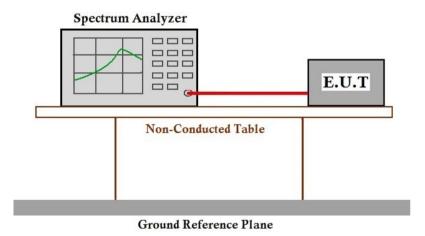
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

## 7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	08	Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation.

#### 7.4.3 Test Setup Diagram



#### 7.4.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220300041301



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Report No.: KSCR220300041301

Page: 20 of 43

### 7.5 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
Test Method: ANSI C63.10 (2013) Section 11.13.3.2

#### Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

### 7.5.1 E.U.T. Operation

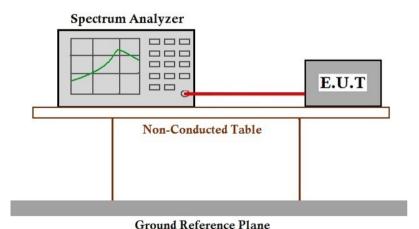
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

### 7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description				
Final test	08	Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation.				

#### 7.5.3 Test Setup Diagram





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Report No.: KSCR220300041301

Page: 21 of 43

#### 7.5.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220300041301



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Report No.: KSCR220300041301

Page: 22 of 43

### 7.6 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d) Test Method: ANSI C63.10 (2013) Section 11.11

#### Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

### 7.6.1 E.U.T. Operation

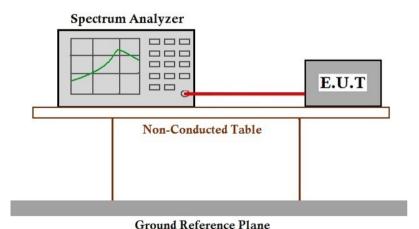
Operating Environment:

Temperature: 24 °C Humidity: % RH Atmospheric Pressure: 1010 mbar

### 7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description				
Final test	80	Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation.				

#### 7.6.3 Test Setup Diagram





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Report No.: KSCR220300041301

Page: 23 of 43

#### 7.6.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220300041301



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Report No.: KSCR220300041301

Page: 24 of 43

## 7.7 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

#### Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

### 7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

### 7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	08	Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation.



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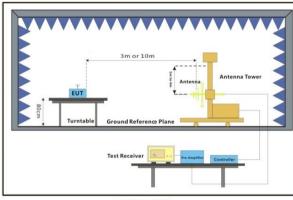
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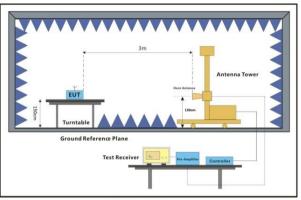


Report No.: KSCR220300041301

Page: 25 of 43

### 7.7.3 Test Setup Diagram





30MHz-1GHz

Above 1GHz

#### 7.7.4 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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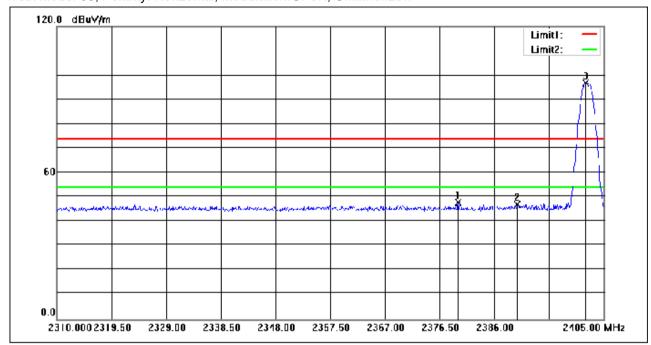
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Report No.: KSCR220300041301

Page: 26 of 43

Test Mode: 08; Polarity: Horizontal; Modulation: GFSK; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2379.730	61.80	-14.05	47.75	74.00	-26.25	peak
2	2390.000	60.85	-14.01	46.84	74.00	-27.16	peak
3	2401.865	110.75	-13.98	96.77	74.00	22.77	peak



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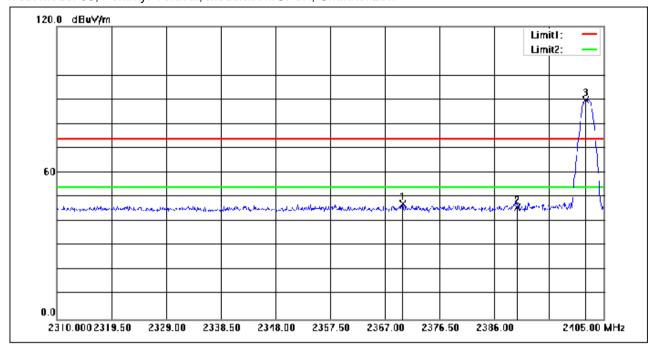
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Report No.: KSCR220300041301

Page: 27 of 43

Test Mode: 08; Polarity: Vertical; Modulation: GFSK; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2370.135	61.43	-14.07	47.36	74.00	-26.64	peak
2	2390.000	59.77	-14.01	45.76	74.00	-28.24	peak
3	2401.865	103.87	-13.98	89.89	74.00	15.89	peak



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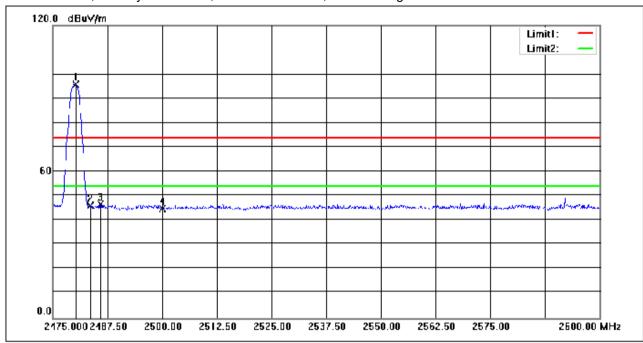
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Report No.: KSCR220300041301

Page: 28 of 43

### Test Mode: 08; Polarity: Horizontal; Modulation: GFSK; Channel: High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.250	109.57	-13.71	95.86	74.00	21.86	peak
2	2483.500	59.80	-13.71	46.09	74.00	-27.91	peak
3	2485.875	60.25	-13.70	46.55	74.00	-27.45	peak
4	2500.000	58.53	-13.64	44.89	74.00	-29.11	peak



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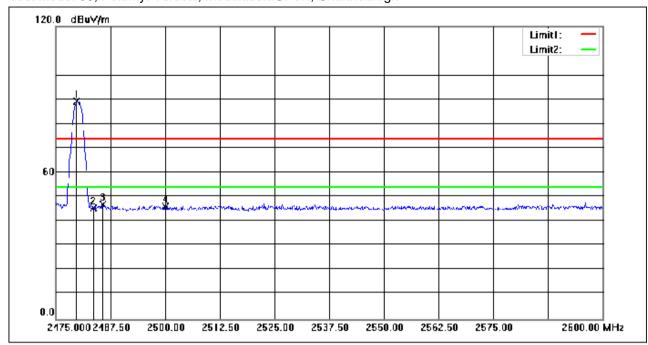
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Report No.: KSCR220300041301

Page: 29 of 43

Test Mode: 08; Polarity: Vertical; Modulation: GFSK; Channel: High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2479.750	102.85	-13.71	89.14	74.00	15.14	peak
2	2483.500	59.19	-13.71	45.48	74.00	-28.52	peak
3	2485.750	60.59	-13.70	46.89	74.00	-27.11	peak
4	2500.000	59.69	-13.64	46.05	74.00	-27.95	peak



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Report No.: KSCR220300041301

Page: 30 of 43

## 7.8 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5

#### Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
960-1000	500	3

### 7.8.1 E.U.T. Operation

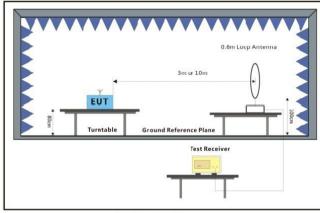
Operating Environment:

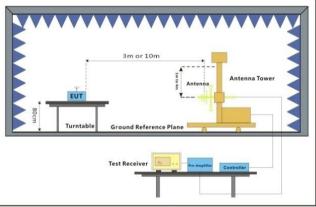
Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description								
Final test	08	Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation.								

### 7.8.3 Test Setup Diagram





Below 30MHz 30MHz-1GHz



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Report No.: KSCR220300041301

Page: 31 of 43

#### 7.8.4 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.

#### Remark:

- 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- 2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



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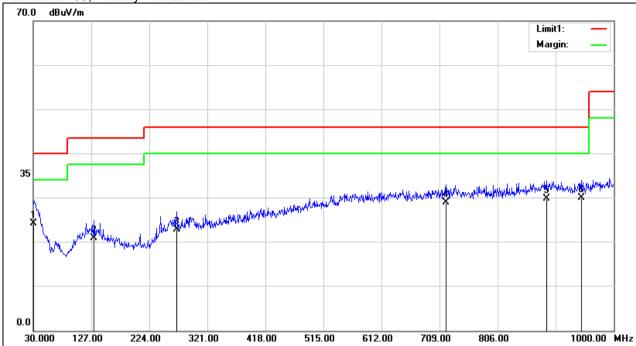
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Report No.: KSCR220300041301

Page: 32 of 43

Test Mode: 08; Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	30.9700	-0.83	25.12	24.29	40.00	-15.71	100	280	QP
2	131.8500	1.66	19.30	20.96	43.50	-22.54	100	343	QP
3	269.5900	2.42	20.49	22.91	46.00	-23.09	100	84	QP
4	719.6700	26.54	2.43	28.97	46.00	-17.03	100	129	QP
5	887.4800	27.52	2.37	29.89	46.00	-16.11	100	350	QP
6	945.6800	27.48	2.61	30.09	46.00	-15.91	100	21	QP



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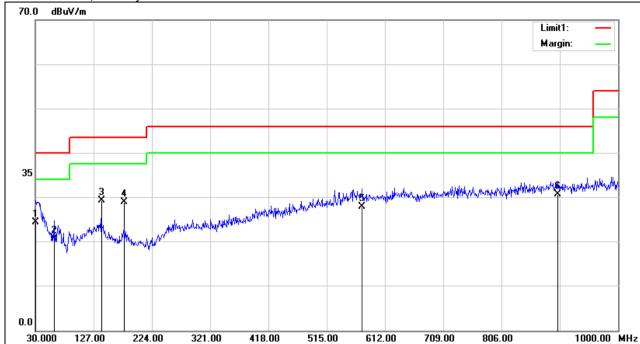
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Report No.: KSCR220300041301

Page: 33 of 43

Test Mode: 08; Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	30.9700	-0.77	25.12	24.35	40.00	-15.65	100	165	QP
2	61.0400	6.06	14.74	20.80	40.00	-19.20	100	158	QP
3	140.5800	10.84	18.48	29.32	43.50	-14.18	100	309	QP
4	177.4400	12.25	16.70	28.95	43.50	-14.55	100	217	QP
5	574.1700	0.97	26.98	27.95	46.00	-18.05	100	294	QP
6	899.1200	28.19	2.44	30.63	46.00	-15.37	100	165	QP



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Report No.: KSCR220300041301

Page: 34 of 43

## 7.9 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.6

#### Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

### 7.9.1 E.U.T. Operation

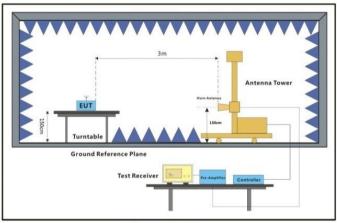
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

#### 7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	08	Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation.

### 7.9.3 Test Setup Diagram



Above 1GHz



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Report No.: KSCR220300041301

Page: 35 of 43

#### 7.9.4 Measurement Procedure and Data

- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- i. Repeat above procedures until all frequencies measured was complete.
- 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- 2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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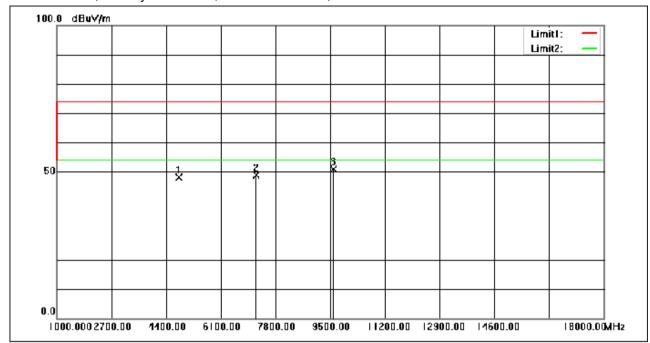
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Report No.: KSCR220300041301

Page: 36 of 43

Test Mode: 08; Polarity: Horizontal; Modulation: GFSK; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4804.000	57.02	-8.86	48.16	74.00	-25.84	peak
2	7206.000	54.89	-5.89	49.00	74.00	-25.00	peak
3	9608.000	52.26	-1.26	51.00	74.00	-23.00	peak



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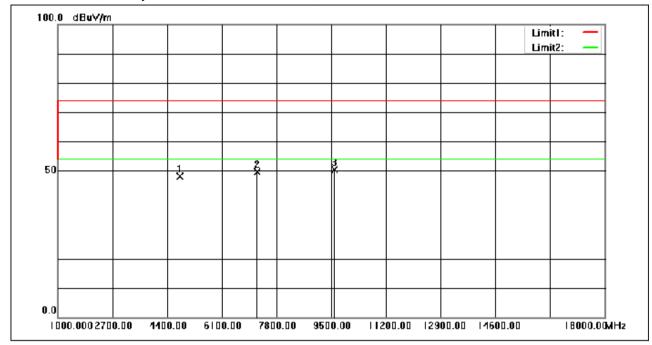
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Report No.: KSCR220300041301

Page: 37 of 43

Test Mode: 08; Polarity: Vertical; Modulation: GFSK; Channel:Low



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4804.000	56.97	-8.86	48.11	74.00	-25.89	peak
2	7206.000	55.42	-5.89	49.53	74.00	-24.47	peak
3	9608.000	51.73	-1.26	50.47	74.00	-23.53	peak



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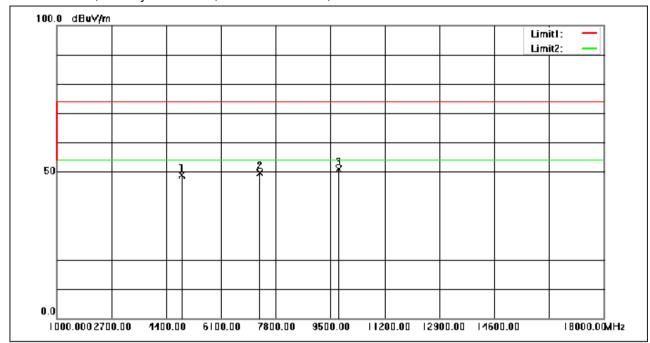
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Report No.: KSCR220300041301

Page: 38 of 43

Test Mode: 08; Polarity: Horizontal; Modulation:GFSK; Channel:middle



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4880.000	57.58	-8.60	48.98	74.00	-25.02	peak
2	7320.000	55.33	-5.77	49.56	74.00	-24.44	peak
3	9760.000	52.40	-1.45	50.95	74.00	-23.05	peak



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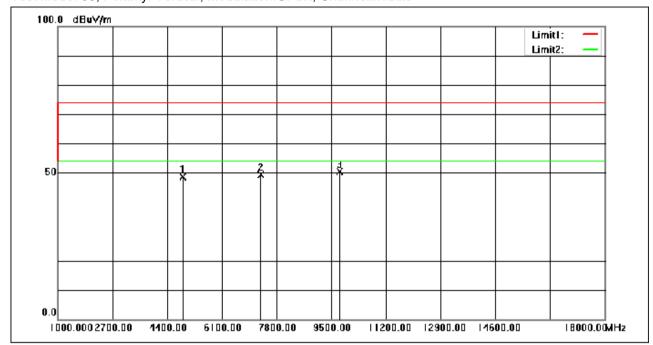
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Report No.: KSCR220300041301

Page: 39 of 43

Test Mode: 08; Polarity: Vertical; Modulation: GFSK; Channel: middle



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4880.000	57.31	-8.60	48.71	74.00	-25.29	peak
2	7320.000	55.20	-5.77	49.43	74.00	-24.57	peak
3	9760.000	51.87	-1.45	50.42	74.00	-23.58	peak



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Report No.: KSCR220300041301

Page: 40 of 43

Test Mode: 08; Polarity: Horizontal; Modulation:GFSK; Channel:High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4960.000	57.07	-8.32	48.75	74.00	-25.25	peak
2	7440.000	54.72	-5.63	49.09	74.00	-24.91	peak
3	9920.000	51.84	-0.94	50.90	74.00	-23.10	peak



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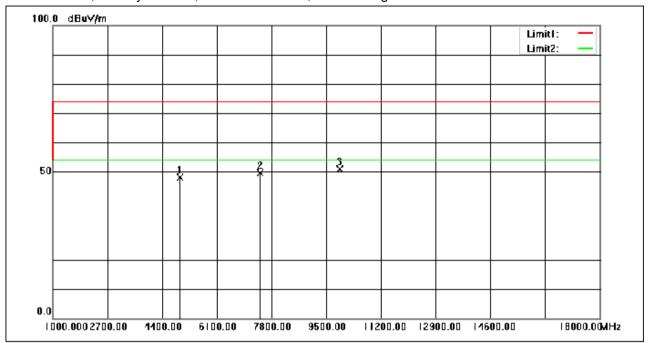
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Report No.: KSCR220300041301

Page: 41 of 43

Test Mode: 08; Polarity: Vertical; Modulation:GFSK; Channel:High



No.	Frequency	Reading	Correction	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4960.000	56.41	-8.32	48.09	74.00	-25.91	peak
2	7440.000	55.37	-5.63	49.74	74.00	-24.26	peak
3	9920.000	51.88	-0.94	50.94	74.00	-23.06	peak



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Report No.: KSCR220300041301

Page: 42 of 43

### 7.10 99% Bandwidth

Test Requirement RSS-Gen Section 6.7
Test Method: ANSI C63.10 Section 6.9.3

### 7.10.1 E.U.T. Operation

**Operating Environment:** 

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

#### 7.10.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	08	Charge + TX mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation.

### 7.10.3 Test Setup Diagram

#### 7.10.4 Measurement Procedure and Data

The detailed test data see: Appendix A for KSCR220300041301



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Report No.: KSCR220300041301

Page: 43 of 43

# 8 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2203000413AT

## 9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for KSCR2203000413AT

- End of the Report -



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