Test Report

Date : 2018-02-12
No. : HM17120055

Applicant:	Gatekeeper Systems (HK) Ltd. 36/F, Tower 2, Times Square, 1 Matheson Street, Causeway Bay, Hong Kong
Manufacturer:	Gatekeeper Systems (HK) Ltd. 36/F, Tower 2, Times Square, 1 Matheson Street, Causeway Bay, Hong Kong
Description of Sample(s):	Product: Caster Version 4.6 Brand Name: Gatekeeper Systems Model Number: 4600 FCC ID: W3Z-4600
Date Sample(s) Received:	2017-11-23
Date Tested:	2017-12-08 to 2017-12-15
Investigation Requested:	Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2016 and ANSI C63.10:2013 for FCC Certification.
Conclusion(s):	The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.
Remark(s):	---

CHEUNG Chi, Kenneth
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

Test Report

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1.0 General Details

1.1 Equipment Under Test [EUT]
Description of Sample(s)

Product:	Caster Version 4.6
Manufacturer:	Gatekeeper Systems (HK) Ltd. Unit 2305, Level 23, Tower 2, Metroplaza, No. 223 Hing Fong Road, Kwai Fong, N.T., Hong Kong.
Brand Name:	Gatekeeper Systems
Model Number:	4600
Rating:	CR17450 x 1=3.0Vd.c (User is not able to recharge and replace the battery)

1.2 Description of EUT Operation

The Equipment Under Test (EUT) is Caster Version 4.6 (Wheel with remote control lock function) of Gatekeeper Systems (HK) Ltd., which is 2.4GHz transceiver.
The 4600 Operational mode transmissions are modulated at 500kbps MSK (Minimum Shift Keying), with a deviation of 19 kHz (Carson's rule bandwidth about 80 kHz). 20kbps FSK (Frequency Shift Keying and 40kHz FSK. The EUT will transmit RF signal after receive a 20kbps FSK RF signal from companion devices.
The EUT was tested under test mode which was set in maximum output power (RF output Power = 0 dBm) and transmit continuously.

1.3 Date of Order

2017-11-23

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2017-12-08 to 2017-12-15

1.6 Country of Origin

China

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2017 Regulations and ANSI C63.10:2013 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION
Results Summary

Test Condition	Test Requirement	Test Method	Class / Severity	Test Result	
				Pass	Fail
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.10:2013	N/A	☒	☐
AC power-line conducted emissions	FCC 47CFR 15.207	ANSI C63.10:2013	N/A	N/A	
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.10:2013	N/A	☒	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Field Strength of Fundamental & Harmonics Emissions

Test Requirement:	FCC 47CFR 15.249
Test Method:	ANSI C63.10:2013
Test Date:	2017-12-08
Mode of Operation:	1. Tx Mode (500kbps, MSK) 2. Tx Mode (20kbps, FSK) 3. Tx Mode (40kbps, FSK)

Test Method:

For emission measurements at or below 1 GHz, the sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. For emission measurements above 1 GHz, the sample was placed 1.5m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. In the frequency range of 9kHz to 30MHz, The center of the loop antenna shall be 1 meter above the ground and rotated loop axis for maximum reading. The emissions worst-case are shown in Test Results of the following pages.

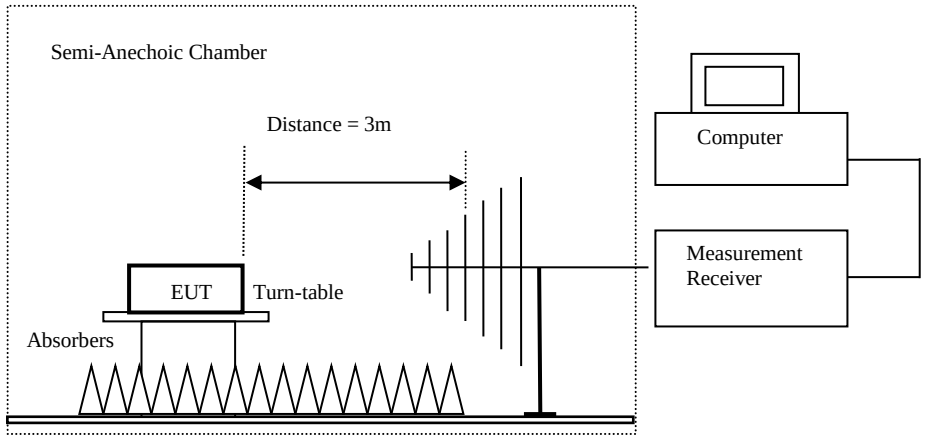
Remark: 3 orthogonal axis apply to hand-held device only.

*: Semi-anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd.
FCC Test Firm Registration Number 723883
Designation Number HK0001

Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	RBW:	10kHz
	VBW:	30kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
30MHz – 1GHz (QP)	RBW:	120kHz
	VBW:	120kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
Above 1GHz (Pk & Av)	RBW:	3MHz
	VBW:	3MHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold

Test Setup:



Ground Plane

Absorbers placed on top of the ground plane are for measurements above 1000MHz only.

Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Fundamental frequency [MHz]	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

Result of TX mode (500kbps MSK) (Lowest Channel), (Above 1GHz): Pass

Field Strength of Fundamental and Harmonics Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2403.5	59.4	27.9	87.3	23,173.9	500,000	Vertical
* 4807.0	13.5	32.1	45.6	190.5	5,000	Vertical
7210.5	3.1	38.6	41.7	121.6	5,000	Vertical
9614.0	Emissions detected are more than 20 dB below the FCC Limits				5,000	Vertical
* 12017.5					5,000	Vertical
14421.0					5,000	Vertical
16824.5					5,000	Vertical
* 19228.0					5,000	Vertical
21631.5					5,000	Vertical
24035.0					5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2403.5	48.6	27.9	76.5	6,683.4	50,000	Vertical
* 4807.0	2.1	32.1	34.2	51.3	500	Vertical
7210.5	-1.3	38.6	37.3	73.3	500	Vertical
9614.0	Emissions detected are more than 20 dB below the FCC Limits				500	Vertical
* 12017.5					500	Vertical
14421.0					500	Vertical
16824.5					500	Vertical
* 19228.0					500	Vertical
21631.5					500	Vertical
24035.0					500	Vertical

Result of TX mode (500kbps MSK) (Middle Channel), (Above 1GHz): Pass

Field Strength of Fundamental and Harmonics Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2440.9	57.8	27.9	85.7	19,275.2	500,000	Vertical
* 4881.8	10.6	32.1	42.7	136.5	5,000	Vertical
* 7322.7	2.9	38.6	41.5	118.9	5,000	Vertical
9763.6	Emissions detected are more than 20 dB below the FCC Limits				5,000	Vertical
* 12204.5					5,000	Vertical
14645.4					5,000	Vertical
17086.3					5,000	Vertical
* 19527.2					5,000	Vertical
21968.1					5,000	Vertical
24409.0					5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2440.9	45.8	27.9	73.7	4,841.7	50,000	Vertical
* 4881.8	1.8	32.1	33.9	49.5	500	Vertical
* 7322.7	-0.5	38.6	38.1	80.4	500	Vertical
9763.6	Emissions detected are more than 20 dB below the FCC Limits				500	Vertical
* 12204.5					500	Vertical
14645.4					500	Vertical
17086.3					500	Vertical
* 19527.2					500	Vertical
21968.1					500	Vertical
24409.0					500	Vertical

Result of TX mode (500kbps MSK) (Highest Channel), (Above 1GHz): Pass

Field Strength of Fundamental and Harmonics Emissions Peak Value							
	Frequency	Measured Level @3m	Correction Factor	Field Strength	Field Strength	Limit @3m	E-Field Polarity
	MHz	dBµV/m	dBµV/m	dBµV/m	µV/m	µV/m	
	2478.6	58.3	27.9	86.2	20,417.4	500,000	Vertical
*	4957.2	12.7	32.1	44.8	173.8	5,000	Vertical
*	7435.8	3.3	38.6	41.9	124.5	5,000	Vertical
	9914.4					5,000	Vertical
*	12393.0					5,000	Vertical
	14871.6					5,000	Vertical
	17350.2	Emissions detected are more than				5,000	Vertical
*	19828.8	20 dB below the FCC Limits				5,000	Vertical
	22307.4					5,000	Vertical
	24786.0					5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions Average Value							
	Frequency	Measured Level @3m	Correction Factor	Field Strength	Field Strength	Limit @3m	E-Field Polarity
	MHz	dBµV/m	dBµV/m	dBµV/m	µV/m	µV/m	
	2478.6	36.1	27.9	64.0	1,584.9	50,000	Vertical
*	4957.2	0.9	32.1	33.0	44.7	500	Vertical
*	7435.8	-0.7	38.6	37.9	78.5	500	Vertical
	9914.4					500	Vertical
*	12393.0					500	Vertical
	14871.6					500	Vertical
	17350.2	Emissions detected are more than				500	Vertical
*	19828.8	20 dB below the FCC Limits				500	Vertical
	22307.4					500	Vertical
	24786.0					500	Vertical

Result of TX mode (20kbps FSK) (Lowest Channel), (Above 1GHz): Pass

Field Strength of Fundamental and Harmonics Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2401.6	57.7	27.9	85.6	19,054.6	500,000	Vertical
* 4803.2	11.7	32.1	43.8	154.9	5,000	Vertical
7204.8	3.1	38.6	41.7	121.6	5,000	Vertical
9606.4	Emissions detected are more than 20 dB below the FCC Limits				5,000	Vertical
* 12008.0					5,000	Vertical
14409.6					5,000	Vertical
16811.2					5,000	Vertical
* 19212.8					5,000	Vertical
21614.4					5,000	Vertical
24016.0					5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2401.6	46.5	27.9	74.4	5,248.1	50,000	Vertical
* 4803.2	2.1	32.1	34.2	51.3	500	Vertical
7204.8	-1.0	38.6	37.6	75.9	500	Vertical
9606.4	Emissions detected are more than 20 dB below the FCC Limits				500	Vertical
* 12008.0					500	Vertical
14409.6					500	Vertical
16811.2					500	Vertical
* 19212.8					500	Vertical
21614.4					500	Vertical
24016.0					500	Vertical

Result of TX mode (20kbps FSK) (Middle Channel), (Above 1GHz): Pass

Field Strength of Fundamental and Harmonics Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2426.4	56.3	27.9	84.2	16,218.1	500,000	Vertical
* 4852.8	11.9	32.1	44.0	158.5	5,000	Vertical
* 7279.2	1.8	38.6	40.4	104.7	5,000	Vertical
9705.6	Emissions detected are more than 20 dB below the FCC Limits				5,000	Vertical
* 12132.0					5,000	Vertical
14558.4					5,000	Vertical
16984.8					5,000	Vertical
* 19411.2					5,000	Vertical
21837.6					5,000	Vertical
24264.0					5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2426.4	39.7	27.9	67.6	2,398.8	50,000	Vertical
* 4852.8	2.1	32.1	34.2	51.3	500	Vertical
* 7279.2	-0.9	38.6	37.7	76.7	500	Vertical
9705.6	Emissions detected are more than 20 dB below the FCC Limits				500	Vertical
* 12132.0					500	Vertical
14558.4					500	Vertical
16984.8					500	Vertical
* 19411.2					500	Vertical
21837.6					500	Vertical
24264.0					500	Vertical

Result of TX mode (20kbps FSK) (Highest Channel), (Above 1GHz): Pass

Field Strength of Fundamental and Harmonics Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2451.8	58.4	27.9	86.3	20,653.8	500,000	Vertical
* 4903.4	12.2	32.1	44.3	164.1	5,000	Vertical
* 7355.1	2.1	38.6	40.7	108.4	5,000	Vertical
9807.2	Emissions detected are more than 20 dB below the FCC Limits				5,000	Vertical
* 12259.0					5,000	Vertical
14710.8					5,000	Vertical
17162.6					5,000	Vertical
* 19614.4					5,000	Vertical
22066.2					5,000	Vertical
24518.0					5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2451.8	48.1	27.9	76.0	6,309.6	50,000	Vertical
* 4903.4	1.3	32.1	33.4	46.8	500	Vertical
* 7355.1	-0.7	38.6	37.9	78.5	500	Vertical
9807.2	Emissions detected are more than 20 dB below the FCC Limits				500	Vertical
* 12259.0					500	Vertical
14710.8					500	Vertical
17162.6					500	Vertical
* 19614.4					500	Vertical
22066.2					500	Vertical
24518.0					500	Vertical

Result of TX mode (40kbps, FSK) (Above 1GHz): Pass

Field Strength of Fundamental and Harmonics Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2433.0	59.2	27.9	87.1	22,646.4	500,000	Vertical
* 4866.0	14.1	32.1	46.2	204.2	5,000	Vertical
* 7299.0	2.3	38.6	40.9	110.9	5,000	Vertical
9732.0	Emissions detected are more than 20 dB below the FCC Limits				5,000	Vertical
* 12165.0					5,000	Vertical
14598.0					5,000	Vertical
17031.0					5,000	Vertical
* 19464.0					5,000	Vertical
21897.0					5,000	Vertical
24330.0					5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2433.0	46.4	27.9	74.3	5,188.0	50,000	Vertical
* 4866.0	0.4	32.1	32.5	42.2	500	Vertical
* 7299.0	-0.5	38.6	38.1	80.4	500	Vertical
9732.0	Emissions detected are more than 20 dB below the FCC Limits				500	Vertical
* 12165.0					500	Vertical
14598.0					500	Vertical
17031.0					500	Vertical
* 19464.0					500	Vertical
21897.0					500	Vertical
24330.0					500	Vertical

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

*: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

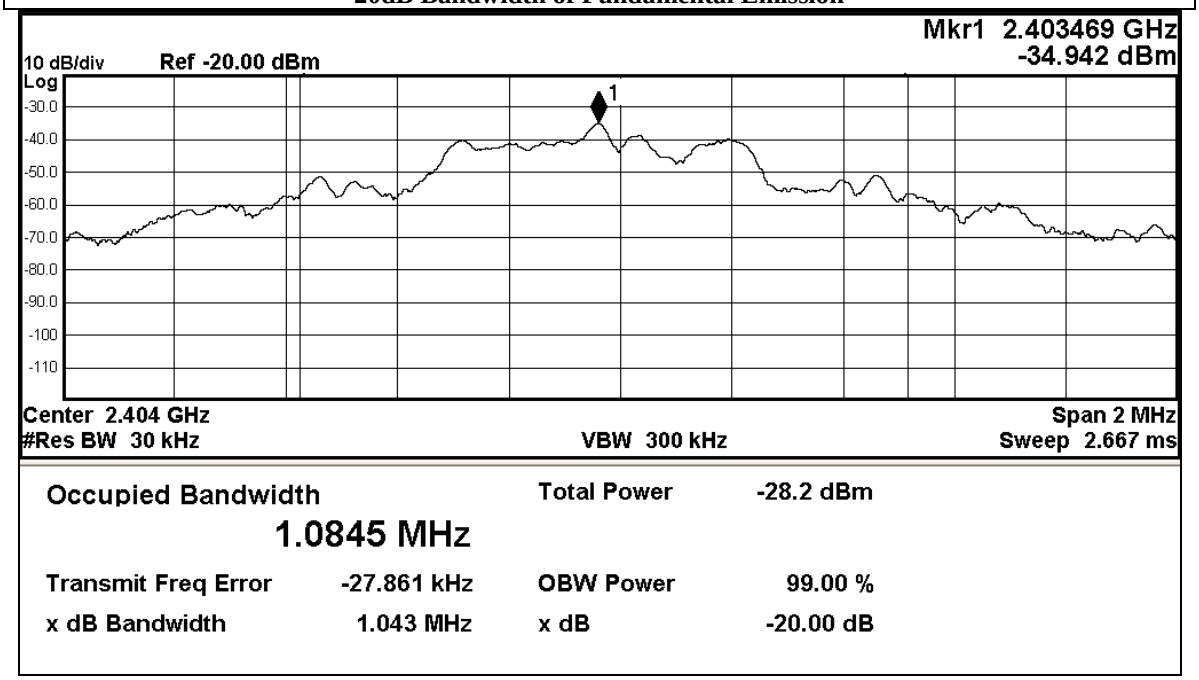
Calculated measurement uncertainty : 9kHz to 30MHz 2.4dB
30MHz to 18GHz 5.0dB

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [MHz]
2403.5	1.04

TX mode (500kbps, MSK) Lowest Channel

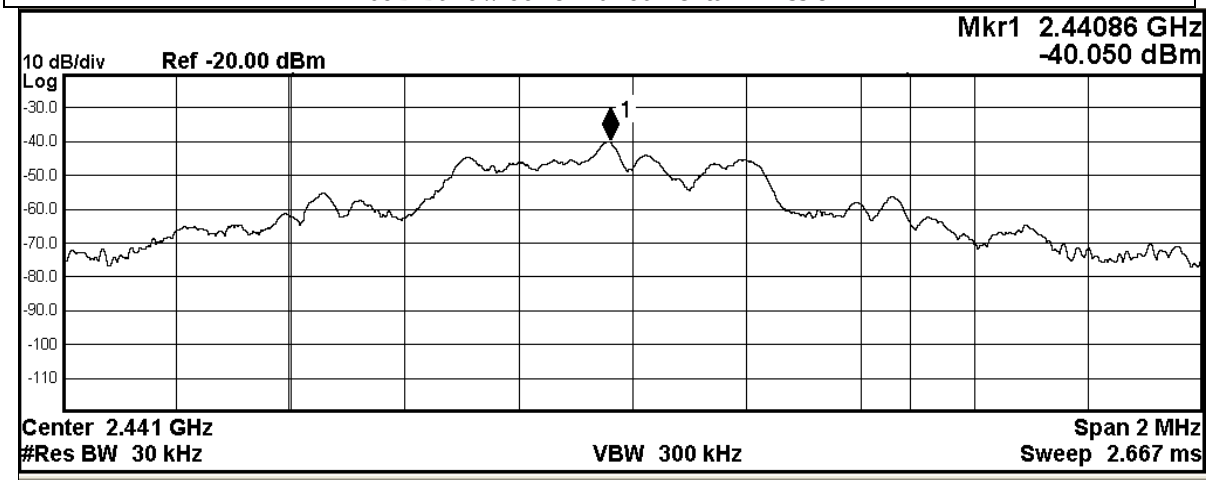
20dB Bandwidth of Fundamental Emission



Frequency Range [MHz]	20dB Bandwidth [MHz]
2440.9	1.04

TX mode (500kbps, MSK) Middle Channel

20dB Bandwidth of Fundamental Emission

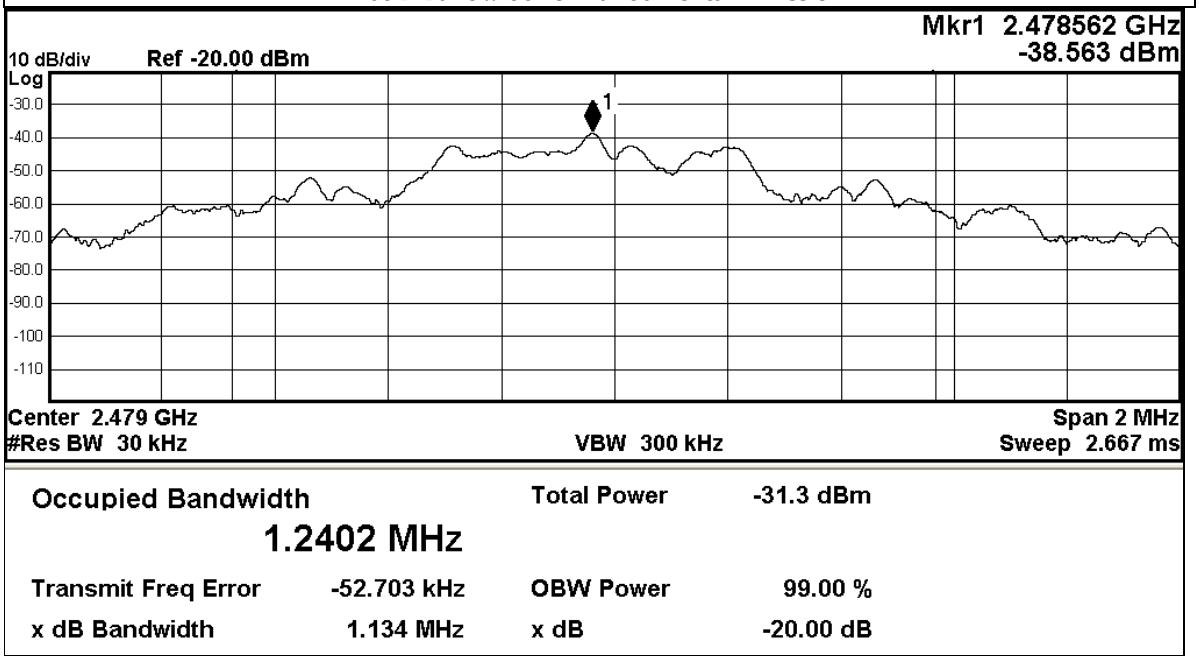


Occupied Bandwidth		Total Power	-33.4 dBm
1.0874 MHz			
Transmit Freq Error	-57.926 kHz	OBW Power	99.00 %
x dB Bandwidth	1.046 MHz	x dB	-20.00 dB

Frequency Range [MHz]	20dB Bandwidth [MHz]
2478.6	1.05

TX mode (500kbps, MSK) Highest Channel

20dB Bandwidth of Fundamental Emission

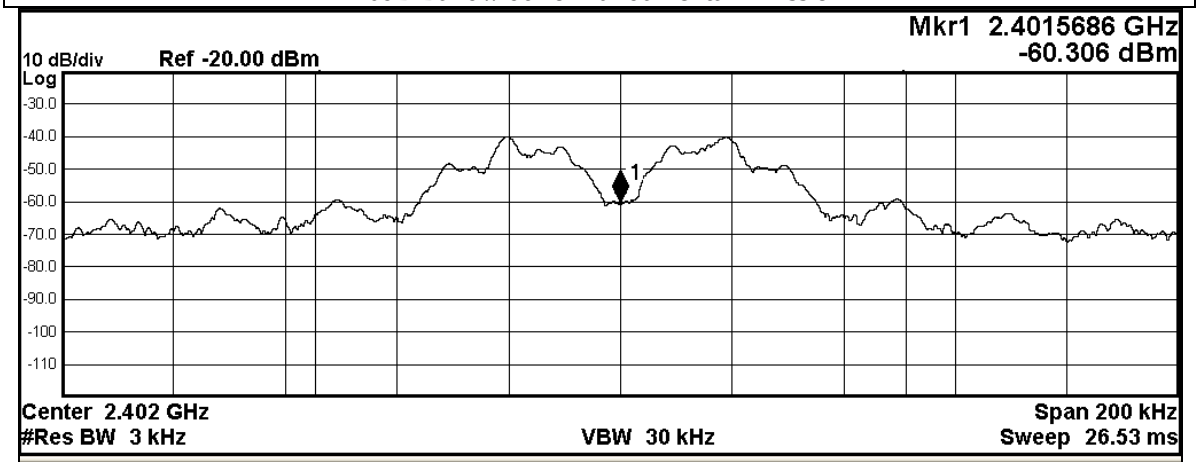


Occupied Bandwidth 1.2402 MHz		Total Power	-31.3 dBm
Transmit Freq Error	-52.703 kHz	OBW Power	99.00 %
x dB Bandwidth	1.134 MHz	x dB	-20.00 dB

Frequency Range [MHz]	20dB Bandwidth [MHz]
2401.6	0.102

TX mode (20kbps, FSK) Lowest Channel

20dB Bandwidth of Fundamental Emission

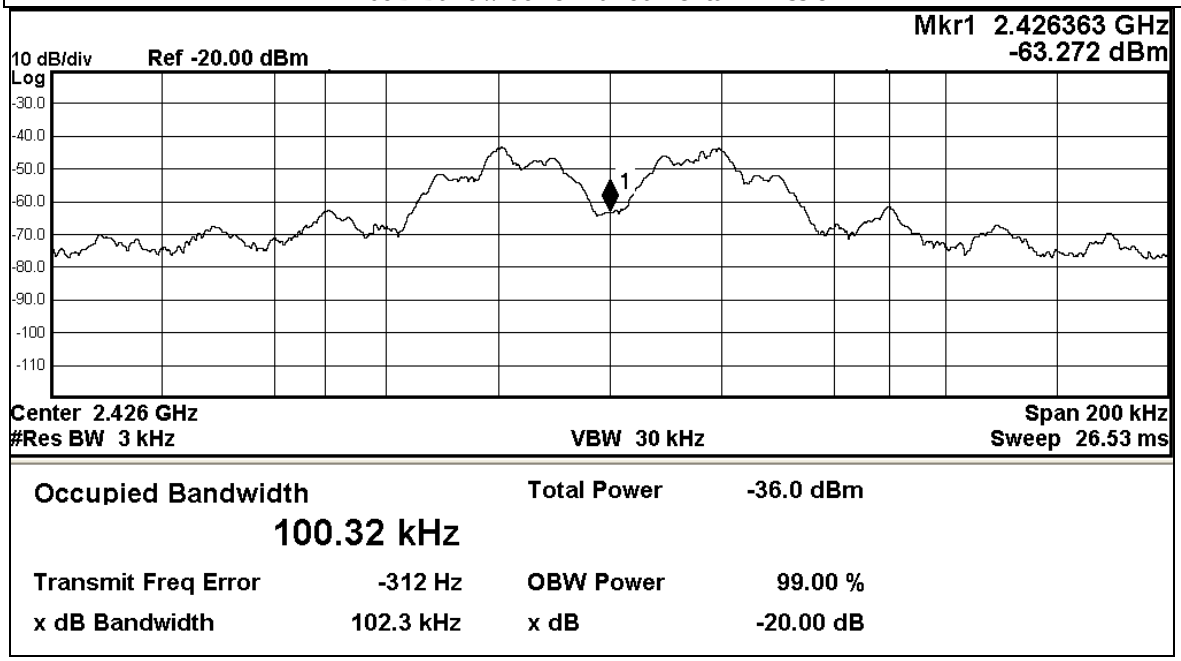


Occupied Bandwidth		Total Power	-32.6 dBm
105.45 kHz			
Transmit Freq Error	-1.659 kHz	OBW Power	99.00 %
x dB Bandwidth	102.0 kHz	x dB	-20.00 dB

Frequency Range [MHz]	20dB Bandwidth [MHz]
2426.4	0.102

TX mode (20kbps, FSK) Middle Channel

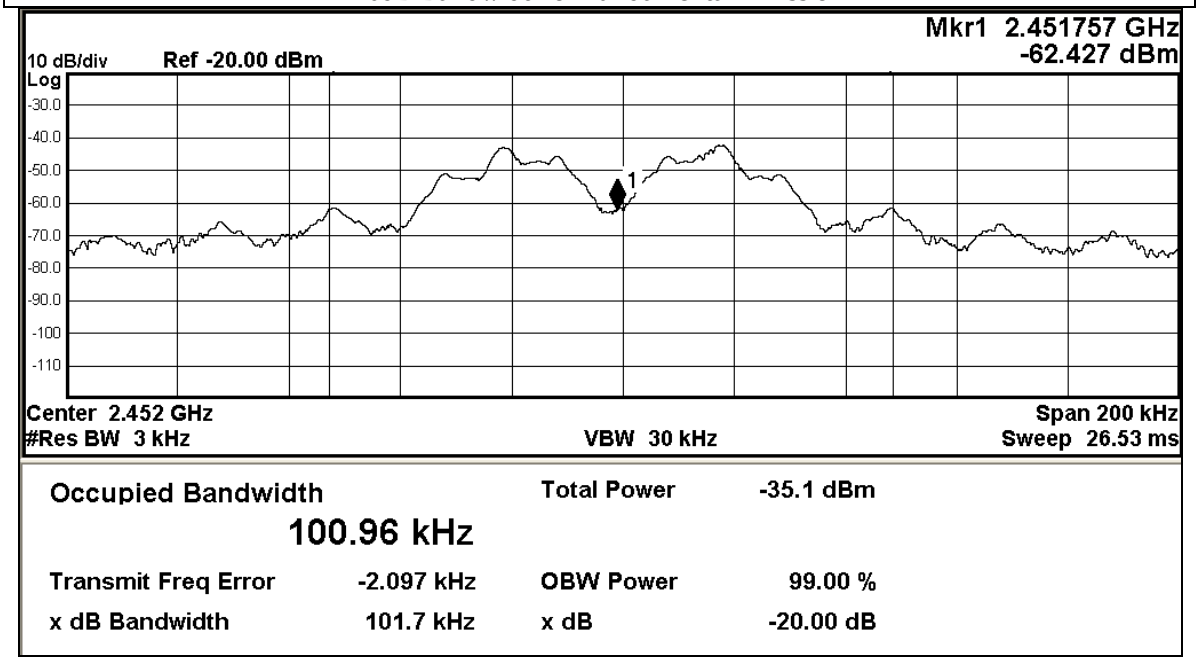
20dB Bandwidth of Fundamental Emission



Frequency Range [MHz]	20dB Bandwidth [MHz]
2451.8	0.102

TX mode (20kbps, FSK) Highest Channel

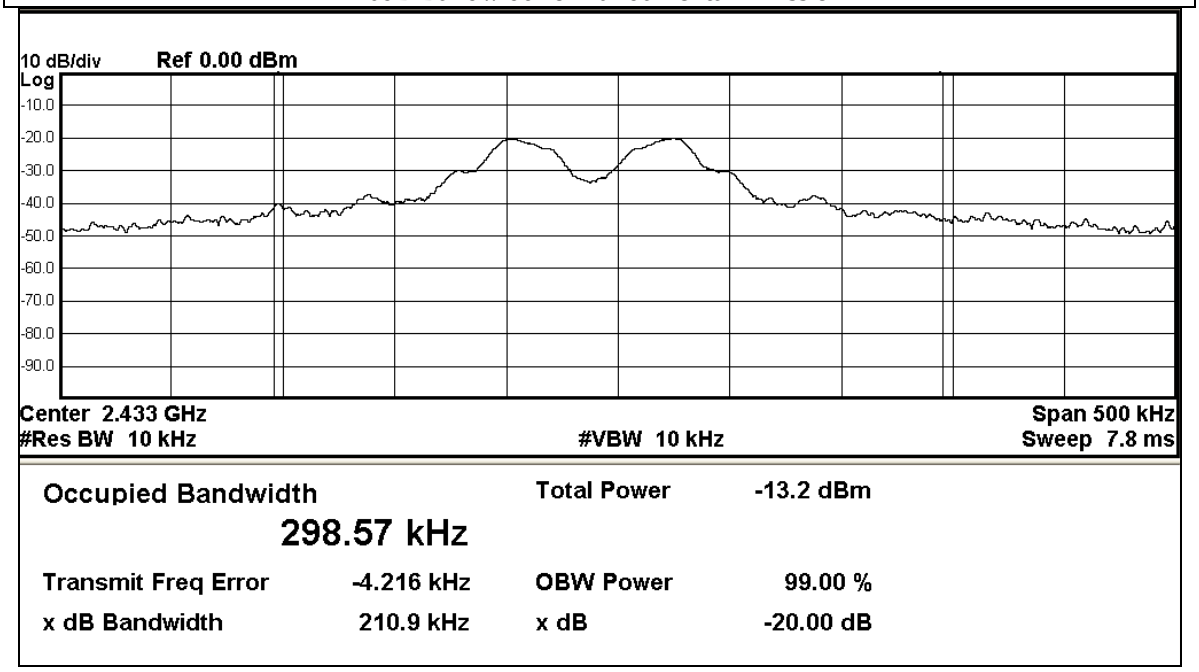
20dB Bandwidth of Fundamental Emission



Frequency Range [MHz]	20dB Bandwidth [MHz]
2433.0	0.211

Tx mode (40kbps, FSK)

20dB Bandwidth of Fundamental Emission

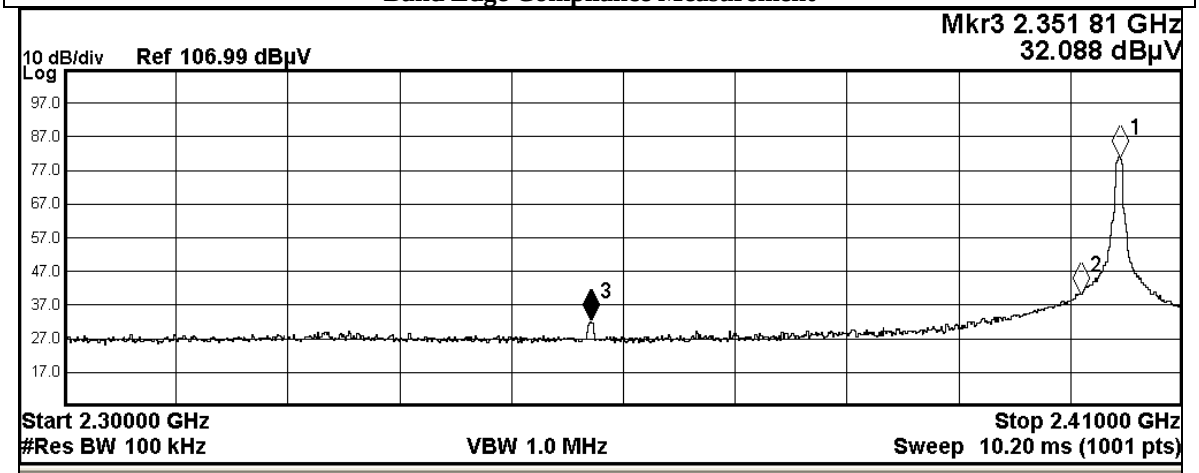


Band Edge Measurement:

TX mode (500kbps, MSK)

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
2400MHz – Lowest Fundamental	40.7

Band Edge Compliance Measurement



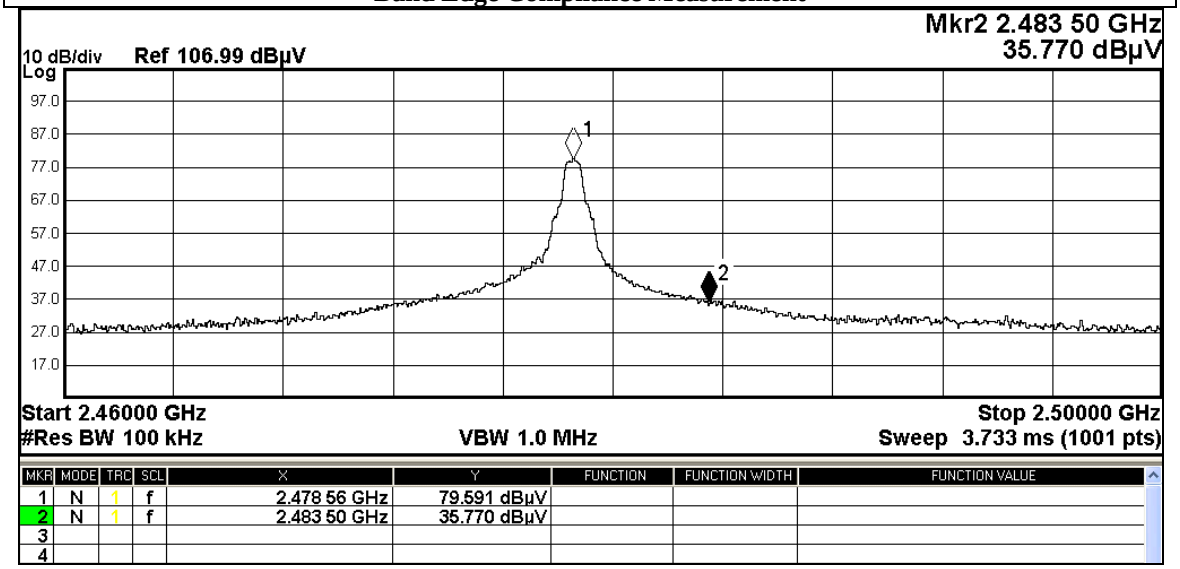
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.403 84 GHz	80.830 dBµV			
2	N	1	f	2.400 00 GHz	40.136 dBµV			
3	N	1	f	2.351 81 GHz	32.088 dBµV			
4								

Band Edge Measurement:

TX mode (500kbps, MSK)

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
Highest Fundamental – 2483.5MHz	43.8

Band Edge Compliance Measurement



Result of TX mode (500kbps, MSK), Band-edge measurement: PASS

Field Strength of Fundamental and Harmonics Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2351.8	8.3	27.6	35.9	62.4	5,000	Vertical
2484.0	9.9	28.0	37.9	78.5	5,000	Vertical

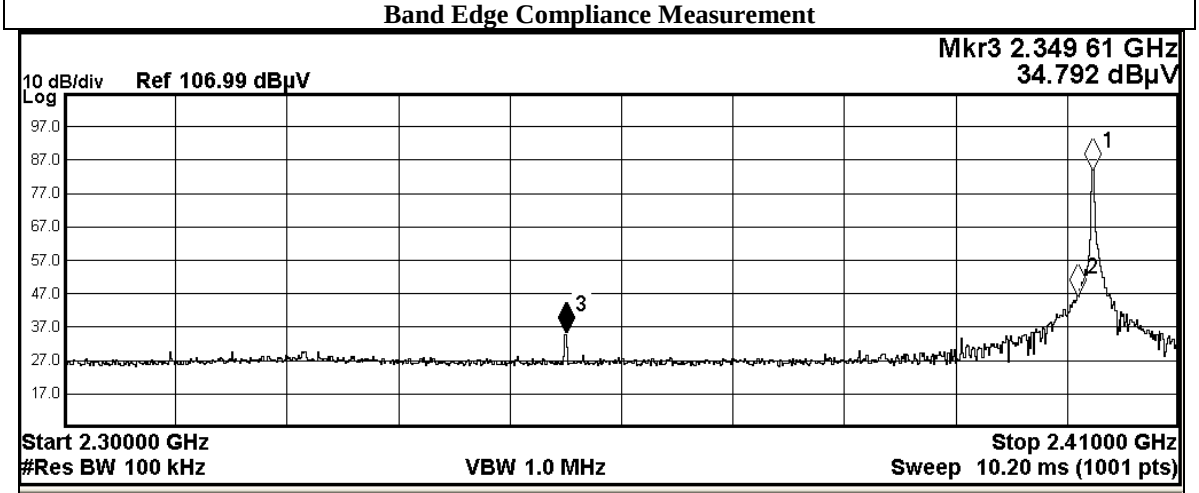
Field Strength of Fundamental and Harmonics Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2351.8	0.9	27.6	28.5	26.6	500	Vertical
2484.0	0.8	28.0	28.8	27.5	500	Vertical

Band Edge Measurement:

TX mode (20kbps, FSK)

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
2400MHz – Lowest Fundamental	37.7

Band Edge Compliance Measurement



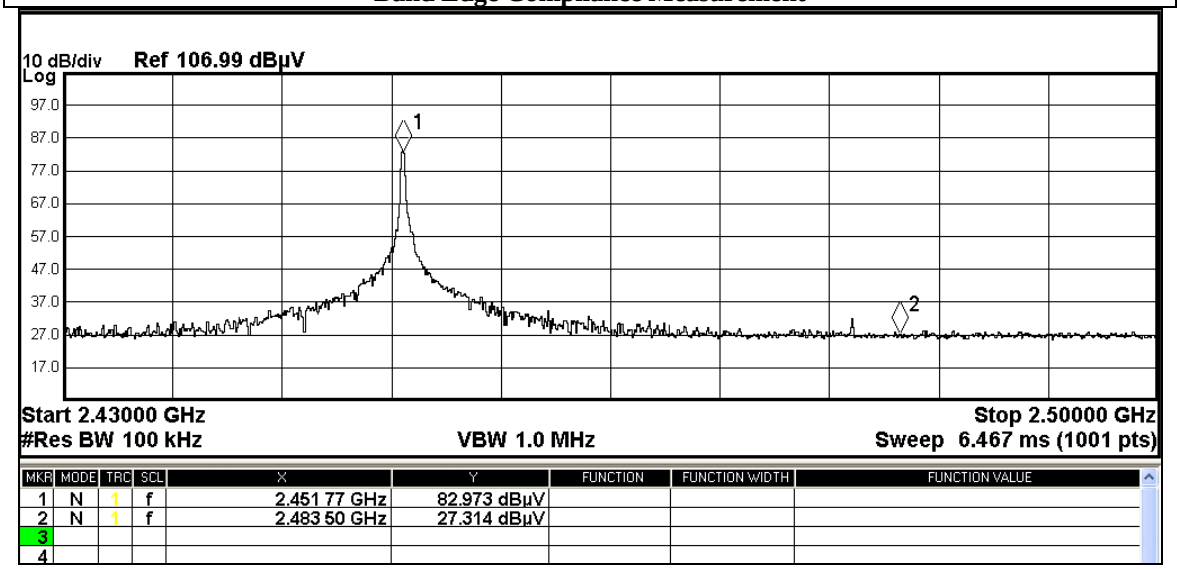
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.401 53 GHz	84.027 dBµV			
2	N	1	f	2.400 00 GHz	46.315 dBµV			
3	N	1	f	2.349 61 GHz	34.792 dBµV			
4								

Band Edge Measurement:

TX mode (20kbps, FSK)

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
Highest Fundamental – 2483.5MHz	55.7

Band Edge Compliance Measurement



Result of TX mode (20kbps, FSK), Band-edge measurement: PASS

Field Strength of Fundamental and Harmonics Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2349.6	10.3	27.9	38.2	81.3	5,000	Vertical
2484.0	3.1	28.0	31.1	35.9	5,000	Vertical

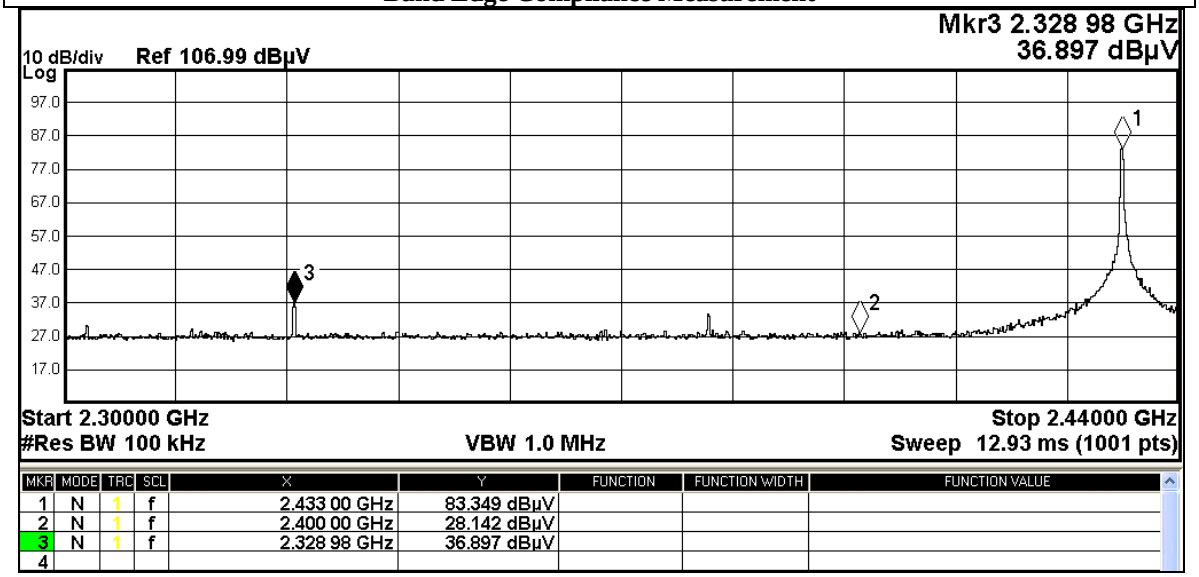
Field Strength of Fundamental and Harmonics Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2349.6	1.1	27.9	29.0	28.2	500	Vertical
2484.0	1.3	28.0	29.3	29.2	500	Vertical

Band Edge Measurement:

TX mode (40kbps, FSK)

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
2400MHz – Lowest Fundamental	55.2

Band Edge Compliance Measurement



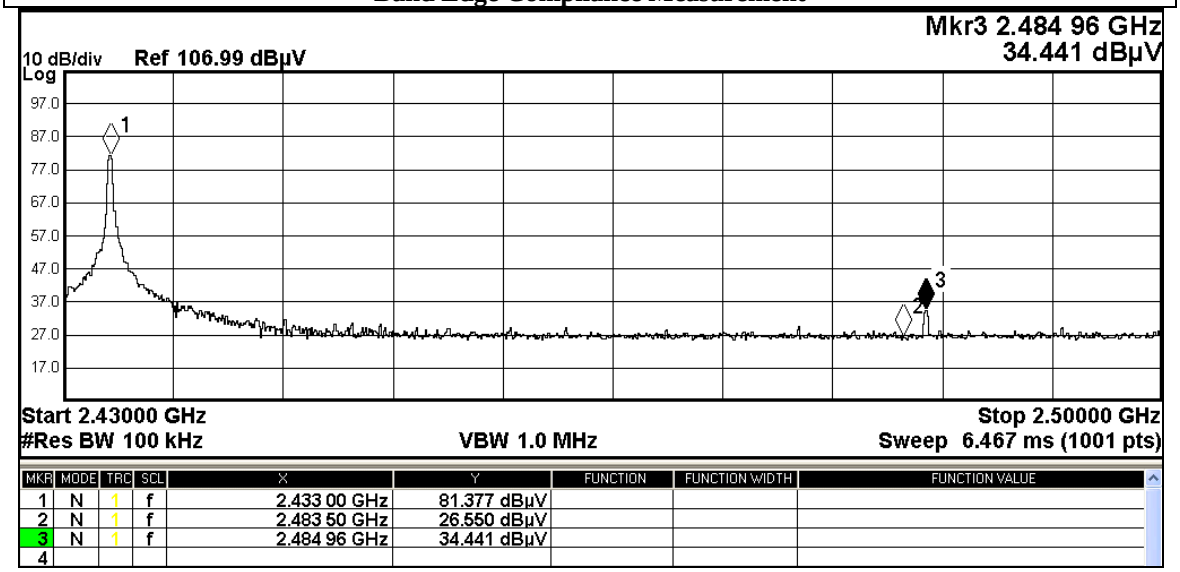
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.433 00 GHz	83.349 dBµV			
2	N	1	f	2.400 00 GHz	28.142 dBµV			
3	N	1	f	2.328 98 GHz	36.897 dBµV			
4								

Band Edge Measurement:

TX mode (40kbps, FSK)

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
Highest Fundamental – 2483.5MHz	54.8

Band Edge Compliance Measurement



Result of TX mode TX mode (40kbps, FSK), Band-edge measurement: PASS

Field Strength of Fundamental and Harmonics Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2329.0	10.6	27.9	38.5	84.1	5,000	Vertical
2485.0	9.7	28.0	37.7	76.7	5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2329.0	0.7	27.9	28.6	26.9	500	Vertical
2485.0	1.1	28.0	29.1	28.5	500	Vertical

Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of On mode, (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the FCC Limits

Result of On mode, (30MHz – 1GHz): PASS

Field Strength of Fundamental and Harmonics Emissions						
Quasi-Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Field Strength	Limit @3m	E-Field Polarity
MHz	dBμV/m	dBμV/m	dBμV/m	μV/m	μV/m	
91.7	0.7	9.2	9.9	3.1	100	Horizontal
113.4	0.4	10.3	10.7	3.4	150	Horizontal
226.7	0.9	14.0	14.9	5.6	150	Horizontal
269.5	1.3	15.7	17.0	7.1	200	Horizontal
355.8	1.9	18.6	20.5	10.6	200	Horizontal
431.9	2.1	21.1	23.2	14.5	200	Horizontal

Result of Receiver mode, (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the Limits

Result of Receiver mode, (30MHz – 1GHz): PASS
Emissions detected are more than 20 dB below the Limits

Result of Receiver mode, (1GHz – 18GHz): PASS

Field Strength of Fundamental and Harmonics Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2440.9	6.4	27.9	34.3	51.9	5,000	Vertical

Field Strength of Fundamental and Harmonics Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV/m	Correction Factor dBµV/m	Field Strength dBµV/m	Field Strength µV/m	Limit @3m µV/m	E-Field Polarity
2440.9	0.3	27.9	28.2	25.7	500	Vertical

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : (9kHz – 30MHz): 2.4dB
(30MHz – 1GHz): 5.0dB
(1GHz - 18GHz): 5.24dB

Appendix A

LIST OF MEASUREMENT EQUIPMENT

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-LINDGREN	FACT-3	--	2017/04/24	2018/04/24
EM356	ANTENNA POSITIONING TOWER	ETS-LINDGREN	2171B	00150346	N/A	N/A
EM354	BICONILOG ANTENNA	ETS-LINDGREN	3143B	00142073	2016/02/29	2018/02/29
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2017/06/01	2018/06/01
EM299	DOUBLE-RIDGED WAVEGUIDE HORN ANTENNA	ETS-LINDGREN	3115	00114120	2016/04/27	2018/04/27
EM300	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-09	00130130	2016/05/13	2018/05/13
EM301	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-10	00130988	2016/05/13	2018/05/13
EM302	PRECISION OMNIDIRECTIONAL DIPOLE (1 – 6GHZ)	SEIBERSDORF LABORATORIES	POD 16	161806/L	2016/05/11	2018/05/11
EM303	PRECISION OMNIDIRECTIONAL DIPOLE (6 – 18GHZ)	SEIBERSDORF LABORATORIES	POD 618	6181908/L	2016/05/11	2018/05/11
EM353	LOOP ANTENNA	ETS_LINDGREN	6502	00206533	2016/03/16	2018/03/16

Remarks:

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

Appendix B

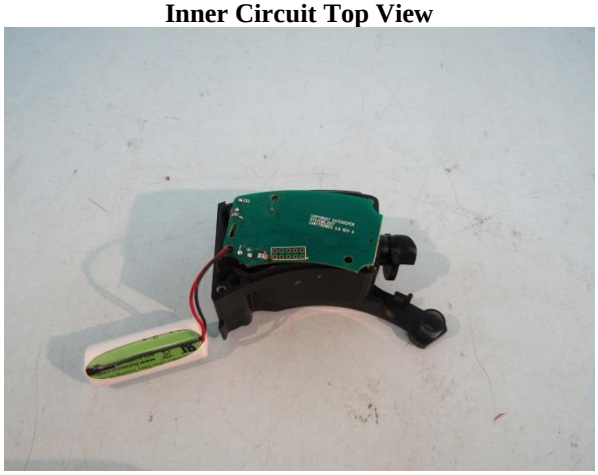
Photographs of EUT

Front View of the product

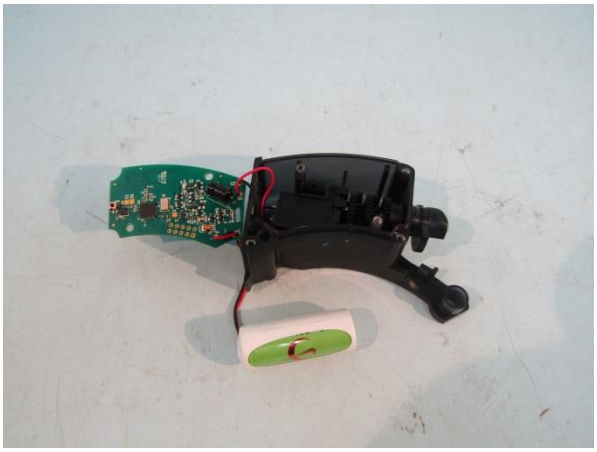
Rear View of the product

Photographs of EUT

Inner Circuit Top View

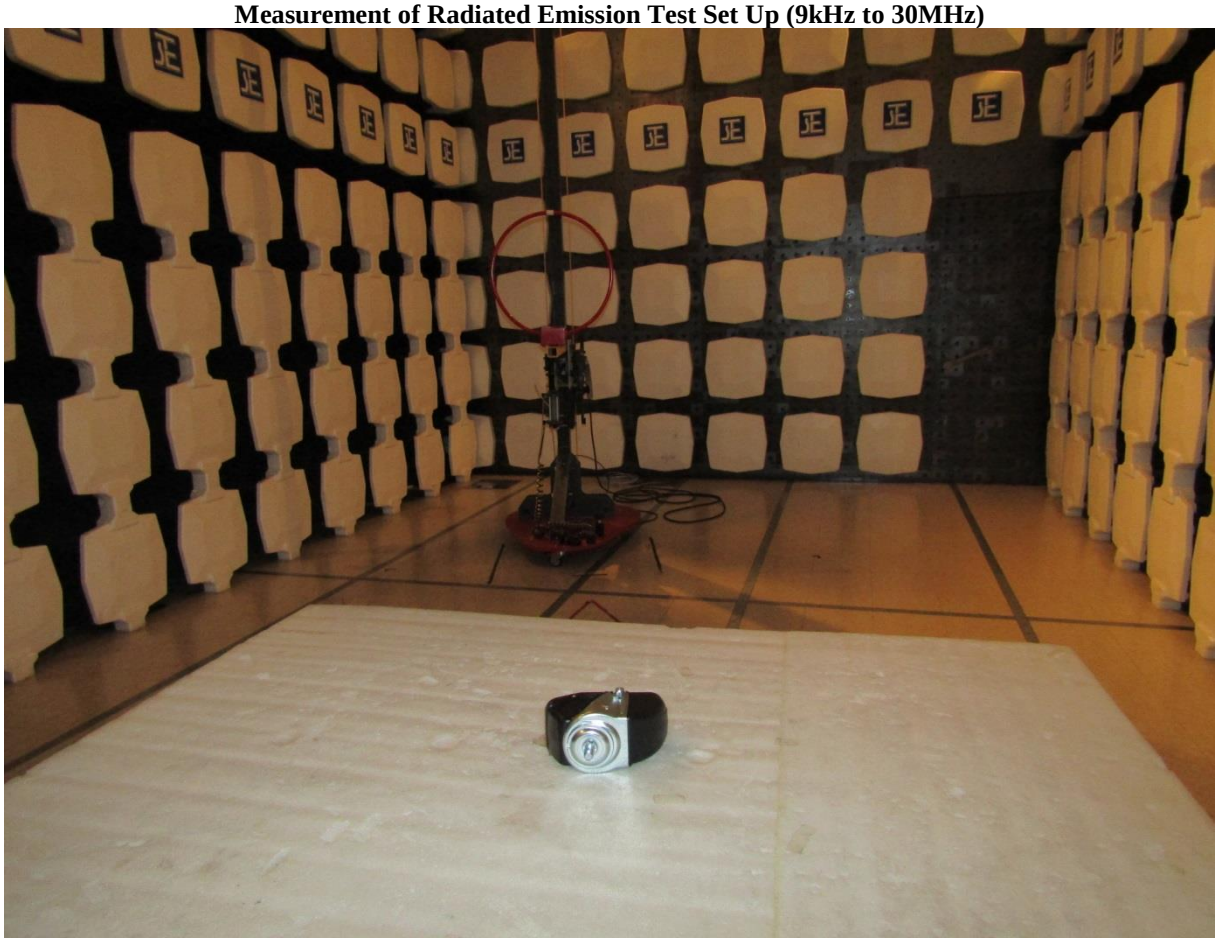


Inner Circuit Bottom View



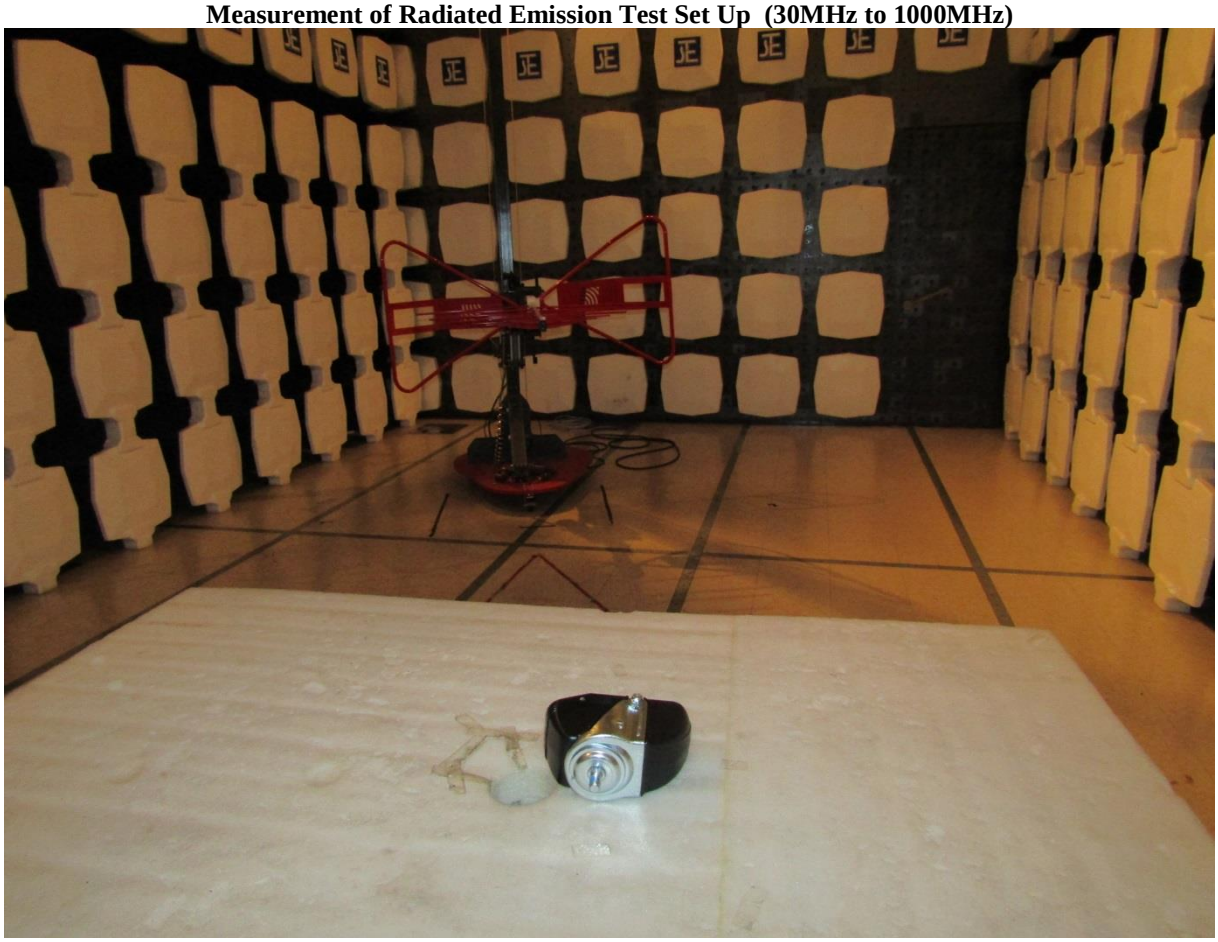
Photographs of EUT

Measurement of Radiated Emission Test Set Up (9kHz to 30MHz)



Photographs of EUT

Measurement of Radiated Emission Test Set Up (30MHz to 1000MHz)



Photographs of EUT

Measurement of Radiated Emission Test Set Up (Above 1000MHz)

******* End of Test Report *******

Conditions of Issuance of Test Reports

1. All samples and goods are accepted by The Hong Kong Standards & Testing Centre Limited (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The Company provides its services on the basis that such terms and conditions constitute express agreement between the Company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by the Company as a result of this application for testing service (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to his customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. The Report refers only to the sample tested and does not apply to the bulk, unless the sampling has been carried out by the Company and is stated as such in the Report.

5. In the event of the improper use the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

6. Sample submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

7. The Company will not be liable for or accept responsibility for any loss or damage howsoever arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

8. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

9. Subject to the variable length of retention time for test data and report stored hereinto as to otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of this test report for a period of three years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after the retention period. Under no circumstances shall we be liable for damages of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

10. Issuance records of the Report are available on the internet at www.stc-group.org. Further enquiry of validity or verification of the Reports should be addressed to the Company.