FCC CO-LOCATION RADIO TEST REPORT

FCC ID	**:**	**2AEUPBHAKE001**
Equipment	**:**	**Ring WallCall**
Model Name	**:**	**8KCEA2** **8KCEAB**
Applicant	**:**	**Ring LLC** **12515 Cerise Ave, Hawthorne, CA 90250, USA**
Standard	**:**	**FCC 47 CFR Part 2, 27**

The product was received on May 20, 2024 and testing was performed from Jun. 13, 2024 to Jun. 17, 2024. We, Sporton International (USA) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International (USA) Inc., the test report shall not be reproduced except in full.

Approved by: Neil Kao

Sporton International (USA) Inc.

1175 Montague Expressway, Milpitas, CA 95035

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History of this test report

Report No.	Version	Description	Issue Date
FG240326001B	01	Initial issue of report	Jun. 20, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1053 §27.53 (h)	Radiated Spurious Emission (Band 4)	Pass	-

Conformity Assessment Condition:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account. 2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”.
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
FCC ID	2AEUPBHAKE001
Equipment	Ring WallCall
Model Name	8KCEA2 8KCEAB
Sample 1	8KCEA2 (A4)
Sample 2	8KCEAB (A5)
Integrated WWAN Module	Brand Name: Quectel Wirelss Solutions Company Limited Model Name: BG95-M3 FCC ID: XMR201910BG95M3
EUT supports Radios application	GSM/EGPRS/LTE/NFC

1.2 Product Specification of Equipment Under Test

Product Specification is subject to this Test Standard	
Tx Frequency	LTE Band 4: 1710.7 MHz ~ 1754.3 MHz
Rx Frequency	LTE Band 4: 2110.7 MHz ~ 2154.3 MHz
Antenna gain	LTE Band 4: 1 dBi
Antenna Type	Dipole on flex Antenna
Type of Modulation	QPSK / 16QAM

1.3 Modification of EUT

No modifications made to the EUT during the testing.

1.4 Testing Location

Test Site	Sporton International (USA) Inc.
Test Site Location	1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300
Test Site No.	**Sporton Site No.**
	03CH01-CA
Test Engineer	Ken Kuo
Temperature (℃)	21.5~23.9
Relative Humidity (%)	40~47

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: US1250

1.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26-2015
- ANSI C63.10-2013
- FCC 47 CFR Part 2, 27
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC Part 15 Subpart C §15.225

Remark: All the test items were validated and recorded in accordance with the standards without any modification during the testing.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.26 exploratory test procedures and only the worst case emissions were reported in this report..

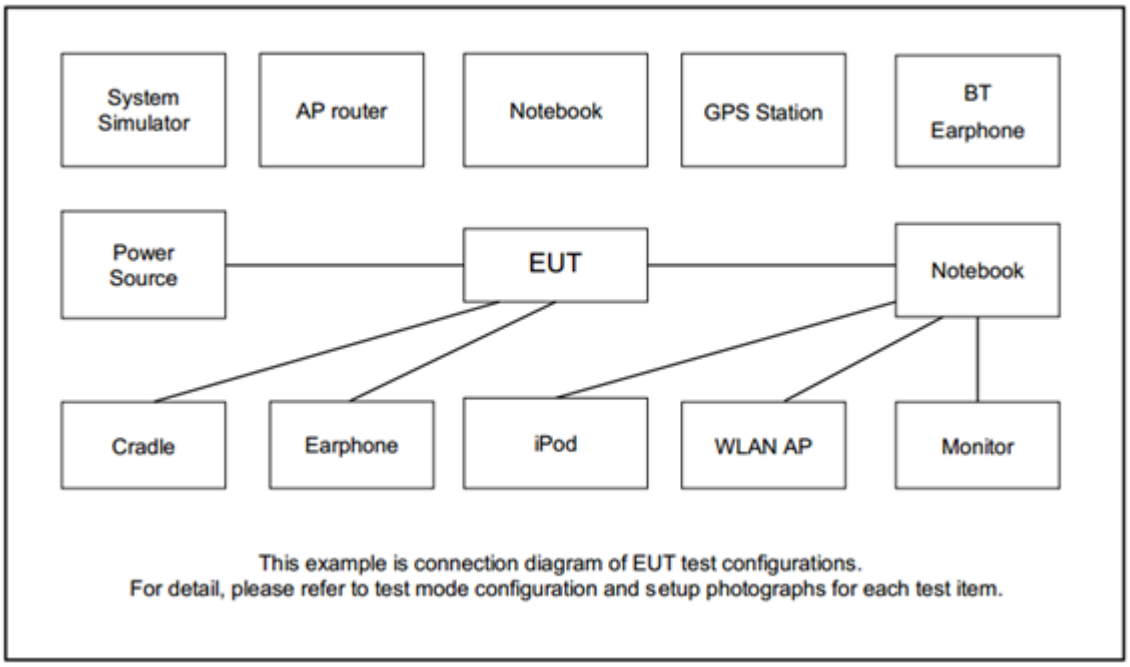
Modulation Type	Modulation
A	QPSK
B	16QAM

Test Item	Modulation Type	Bandwidth	RB Size	Channel
RSE	A	20 MHz	1RB	M

Remark:

1. Evaluated all the transmitter signal and reporting worst-case configuration among all modulation types.
2. The device is investigated from 1GHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst-case emissions are reported.
3. All the radiated test cases were performed with Sample 1.

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMW500	N/A	N/A	Unshielded, 1.8 m
2.	POE	cudy	POE400	N/A	N/A	N/A

2.4 Frequency List of Low/Middle/High Channels

LTE Band 4 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	20050	20175	20300
	Frequency	1720	1732.5	1745

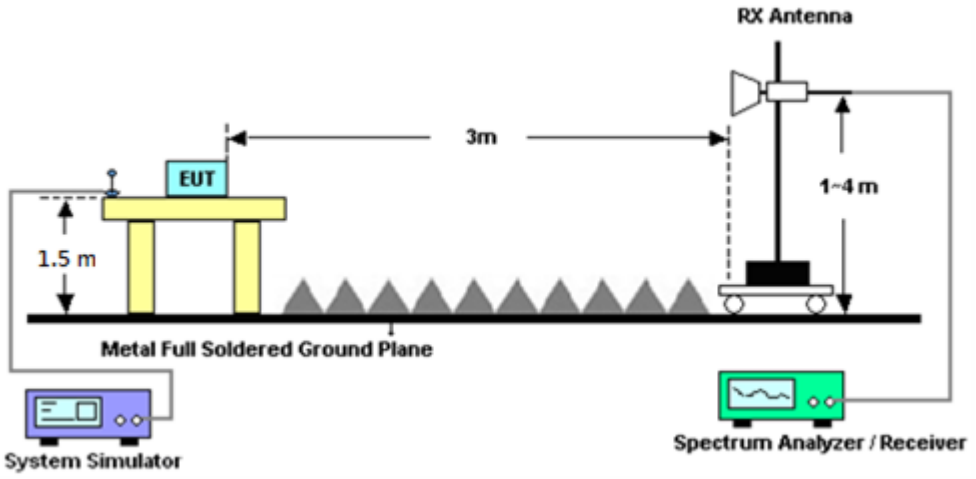
3 Radiated Test Items

3.1 Measuring Instruments

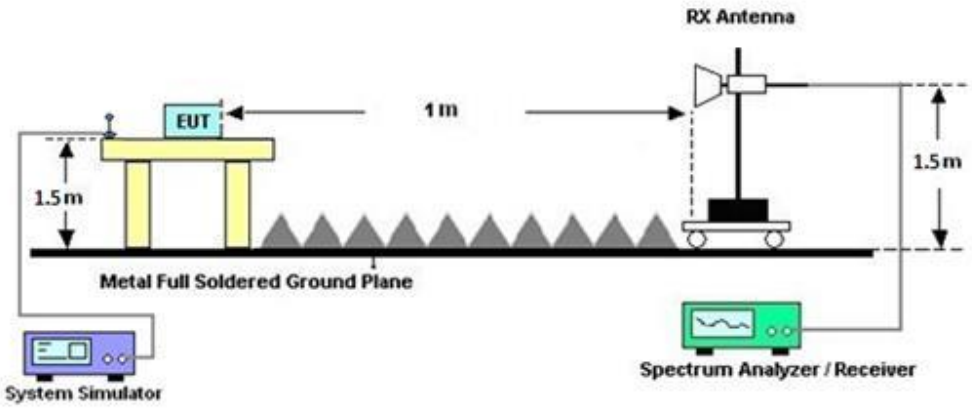
See list of measuring instruments of this test report.

3.1.1 Test Setup

For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



3.1.2 Test Result of Radiated Test

Please refer to Appendix A.

3.2 Radiated Spurious Emission Measurement

3.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

The spectrum is scanned from 1 GHz up to a frequency including its 10th harmonic.

3.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI C63.26-2015 section 5.5.4 Radiated measurement using the field strength method.

1. The EUT was placed on a turntable with 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. To convert spectrum reading E(dBuV/m) to EIRP(dBm)

   EIRP(dBm) = Level (dBuV/m) + 20log(d) -104.77,

   where d is the distance at which filed strength limit is specified in the rules
7. Field Strength Level (dBm) = Spectrum Reading (dBm) + Antenna Factor + Cable Loss + Read Level - Preamp Factor.
8. ERP (dBm) = EIRP (dBm) - 2.15
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Horn Antenna	SCHWARZBECK	BBHA 9120D	02115	1GHz~18GHz	Aug. 09, 2023	Jun. 13, 2024~ Jun. 17, 2024	Aug. 08, 2024	Radiation (03CH01-CA)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00842	18GHz~40GHz	Jul. 17, 2023	Jun. 13, 2024~ Jun. 17, 2024	Jul. 16, 2024	Radiation (03CH01-CA)
Preamplifier	E-instrument	ERA-100M-18G-56-01-A70	EC1900251	1GHz~18GHz	Jun. 27, 2023	Jun. 13, 2024~ Jun. 17, 2024	Jun. 26, 2024	Radiation (03CH01-CA)
Preamplifier	EMEC	EMC18G40G	060725	18GHz-40GHz	Apr. 24, 2024	Jun. 13, 2024~ Jun. 17, 2024	Apr. 23, 2025	Radiation (03CH01-CA)
RF Cable	HUBER+SUHNER	SUCOFLEX 102	8015932/2, 8015762/2, 804938/2	N/A	Mar. 05, 2024	Jun. 13, 2024~ Jun. 17, 2024	Mar. 04, 2025	Radiation (03CH01-CA)
Hygrometer	TESEO	608-H1	45142559	N/A	Aug. 30, 2023	Jun. 13, 2024~ Jun. 17, 2024	Aug. 29, 2024	Radiation (03CH01-CA)
Controller	Chaintek	EM-1000	060881	Control Turn Table & Antenna Mast	N/A	Jun. 13, 2024~ Jun. 17, 2024	N/A	Radiation (03CH01-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Jun. 13, 2024~ Jun. 17, 2024	N/A	Radiation (03CH01-CA)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Jun. 13, 2024~ Jun. 17, 2024	N/A	Radiation (03CH01-CA)
Test Software	Audix E3	E6.2009-8-24d	PK-002093	N/A	N/A	Jun. 13, 2024~ Jun. 17, 2024	N/A	Radiation (03CH01-CA)

5 Measurement Uncertainty

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.60 dB**

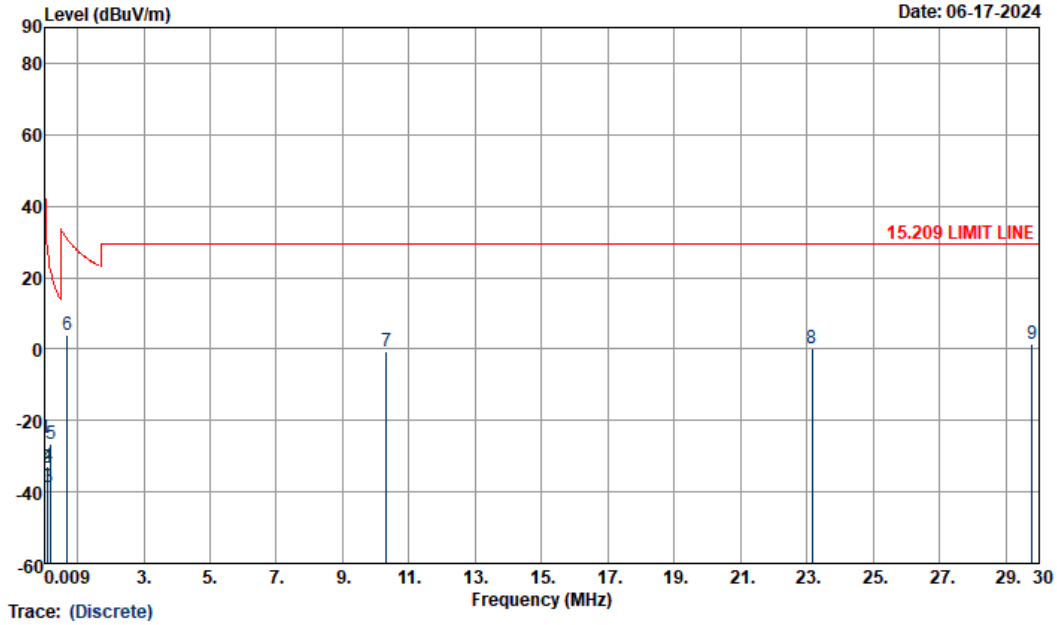
Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.30 dB**

Appendix A. Test Results of Radiated Test

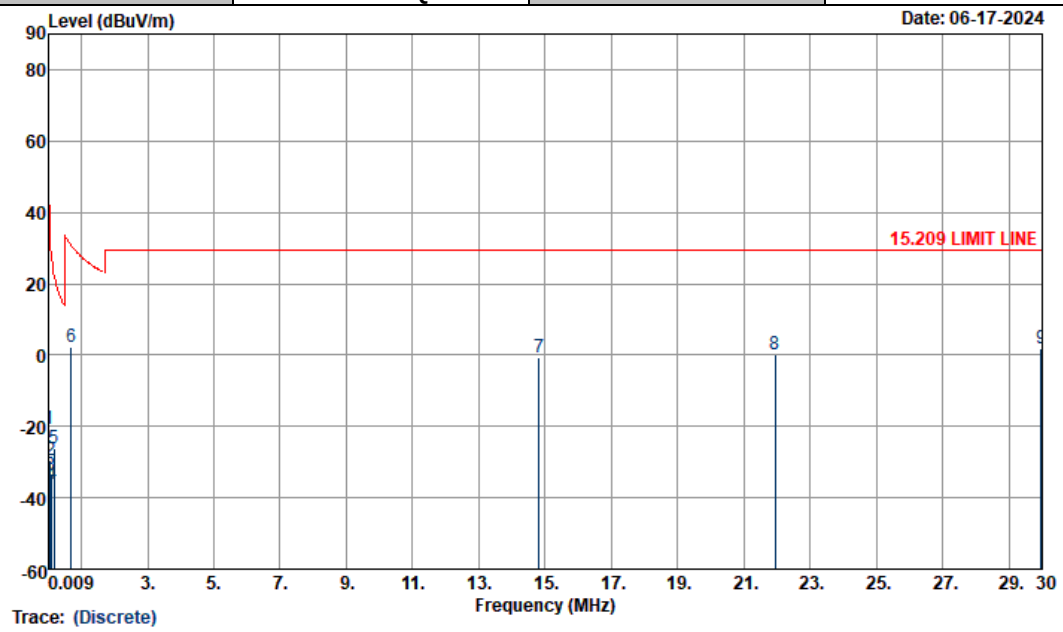
Results of Radiated Spurious Emissions (9 kHz~30MHz)

Test Mode :	NFC TX + LTE B4 20M Ch20175 1RB0 QPSK	Polarization :	Horizontal



Frequency (MHz)	Level (dBµV/m)	Distance extrapolation Factor (dB)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.01068	-24.92	80	-71.95	47.03	25.19	29.84	0.05	-	-	Average
0.08637	-33.25	80	-62.13	28.88	16.53	30.16	0.06	-	-	Average
0.1032	-38.49	80	-65.82	27.33	11.58	29.87	0.06	-	-	QP
0.11508	-32.78	80	-59.16	26.38	17.28	29.88	0.06	-	-	Average
0.2061	-26.46	80	-47.78	21.32	23.55	29.91	0.08	-	-	Average
0.68526	4.06	40	-26.83	30.89	13.92	30.02	0.12	-	-	QP
10.32	-0.54	40	-30.04	29.5	7.95	31.03	0.48	-	-	QP
23.155	0.18	40	-29.32	29.5	7.09	32.36	0.73	-	-	QP
29.78	1.28	40	-28.22	29.5	7.22	33.23	0.83	-	-	QP

Test Mode :	NFC TX + LTE B4 20M Ch20175 1RB0 QPSK	Polarization :	Vertical



Site : 03CH01-CA
Condition : 15.209 LIMIT LINE 3m LOOP_100840_ON230629 VERTICAL
: RBW:9.000KHz VBW:27.000KHz SWT:Auto

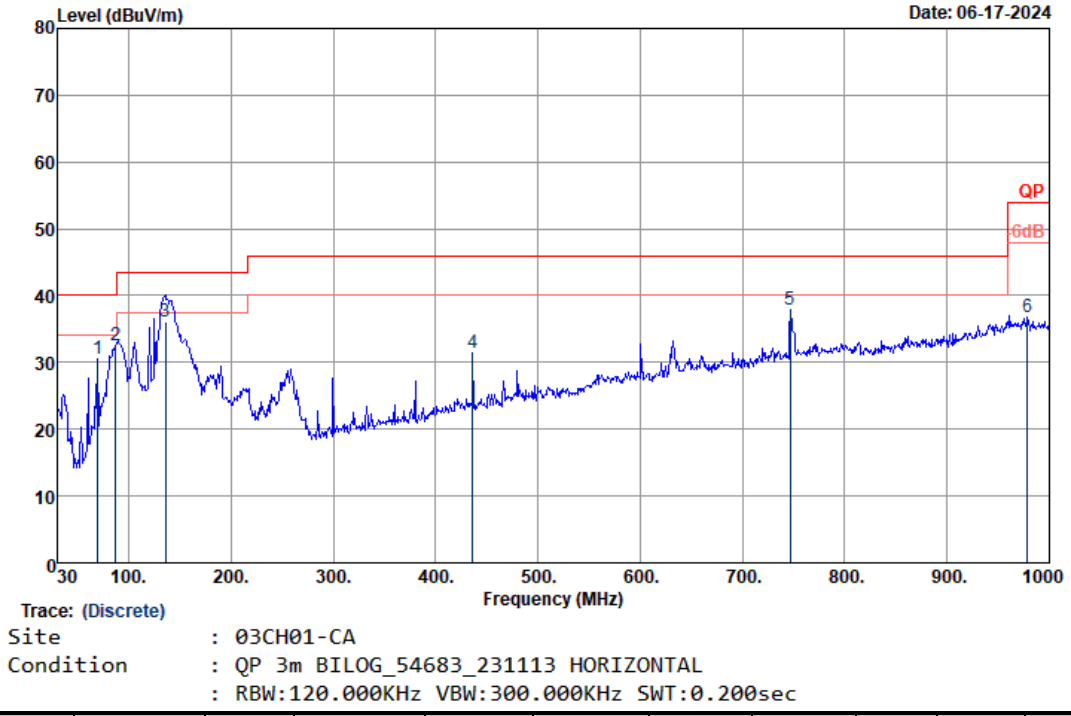
Frequency (MHz)	Level (dBµV/m)	Distance extrapolation Factor (dB)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.01609	-20.58	80	-64.05	43.47	29.42	29.95	0.05	-	-	Average
0.06405	-29.31	80	-60.78	31.47	20.5	30.13	0.06	-	-	Average
0.09586	-33.76	80	-61.73	27.97	16.17	30.01	0.06	-	-	QP
0.1118	-36.16	80	-62.8	26.64	13.91	29.87	0.06	-	-	Average
0.16666	-26.16	80	-49.33	23.17	23.87	29.9	0.07	-	-	Average
0.68526	2.16	40	-28.73	30.89	12.02	30.02	0.12	-	-	QP
14.824	-0.73	40	-30.23	29.5	7.2	31.5	0.57	-	-	QP
21.94	0.09	40	-29.41	29.5	7.12	32.27	0.7	-	-	QP
29.965	2	40	-27.5	29.5	7.92	33.25	0.83	-	-	QP

Note :

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Level = Antenna Factor + Cable Loss + Read Level - Distance extrapolation factor.
4. 13.56 MHz is fundamental signal which can be ignored.
5. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

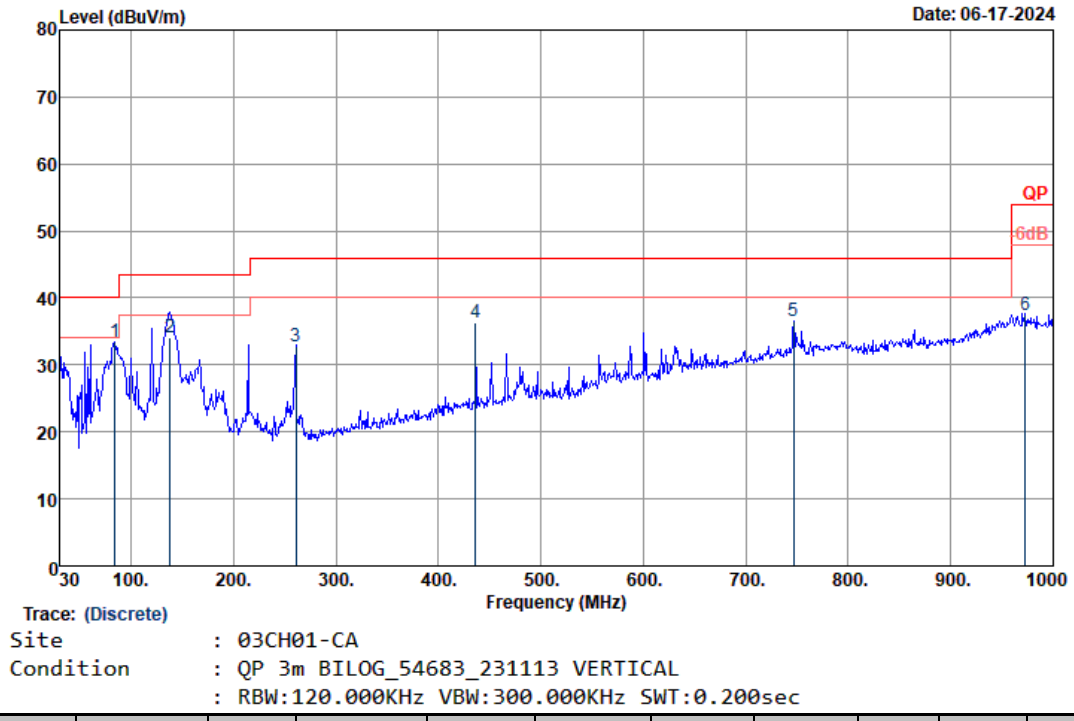
Results of Radiated Spurious Emissions (30MHz~1GHz)

Test Mode :	NFC TX + LTE B4 20M Ch20175 1RB0 QPSK	Polarization :	Horizontal



Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
69.77	30.52	-9.48	40	49.27	12.28	1.28	32.47	-	-	Peak
87.23	32.63	-7.37	40	49.28	14.32	1.41	32.45	-	-	Peak
135.73	36.14	-7.36	43.5	49.16	17.5	1.78	32.44	277	300	QP
436.43	31.41	-14.59	46	37.64	22.9	3.2	32.55	-	-	Peak
746.83	37.86	-8.14	46	36.72	28.04	4.2	32.45	-	-	Peak
978.66	36.67	-17.33	54	30.37	30.75	4.82	30.98	-	-	Peak

Test Mode :	NFC TX + LTE B4 20M Ch20175 1RB0 QPSK	Polarization :	Vertical



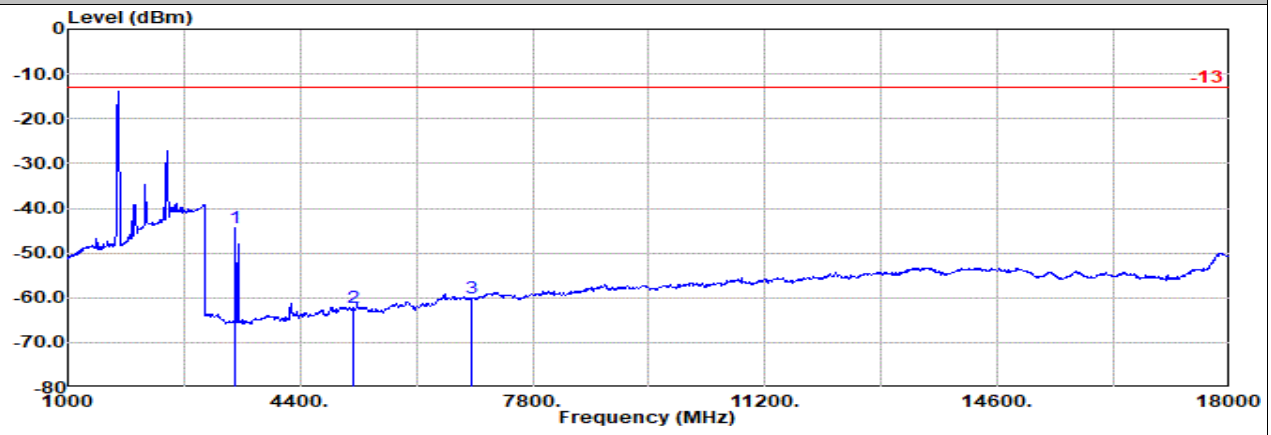
Frequency (MHz)	Level (dBµV/m)	Margin (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
84.32	33.51	-6.49	40	49.94	14.1	1.6	32.21	-	-	Peak
137.67	34	-9.5	43.5	46.52	17.5	2.03	32.18	95	2	QP
260.86	32.84	-13.16	46	42.39	19.88	2.65	32.2	-	-	Peak
436.43	36.23	-9.77	46	41.98	22.9	3.39	32.26	-	-	Peak
746.83	36.47	-9.53	46	34.6	28.04	4.49	32.01	-	-	Peak
972.84	37.53	-16.47	54	30.47	30.99	5.01	30.56	-	-	Peak

Note:

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Emission level (dBµV/m) = 20 log Emission level (µV/m).
3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor= Level.
4. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

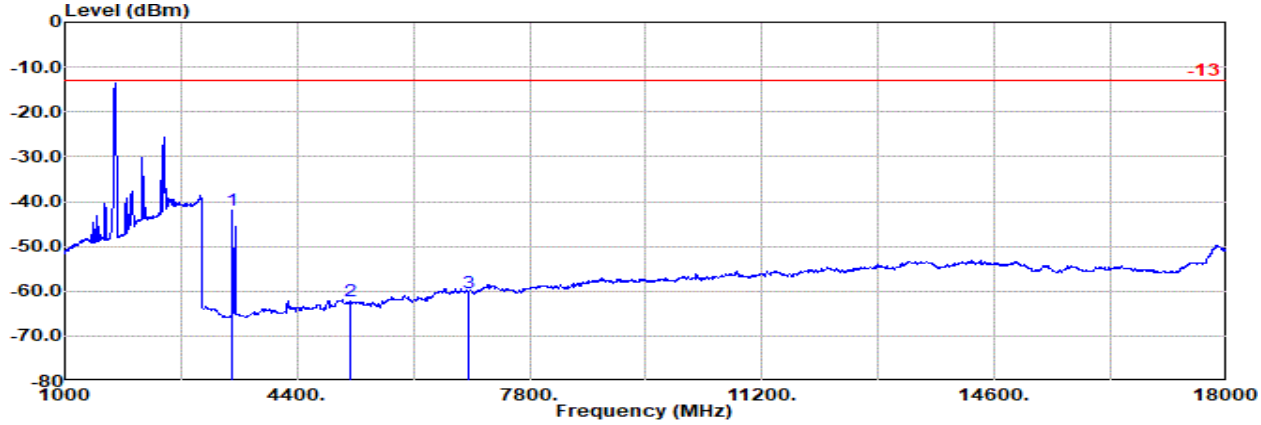
Results of Radiated Spurious Emissions (1GHz~18GHz)

NFC TX + LTE B4 20M Ch20175 1RB0 QPSK



Site : 03CH01-CA
Condition: -13 3m HORN_02115_230809 Horizontal
: LTE Band 4 20M Ch20175 1RB0 QPSK

	Freq	Level	Detector	Ant Factor	Amp\Cb l	Filter	EIRPCF	Readin g	Limit	Margin	Pol
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB	
1	3447.18	-44.51	RMS	29.49	-58.33	1.02	-95.23	78.54	-13.00	-31.51	Horizontal
2	5170.77	-62.25	RMS	33.08	-56.30	0.49	-95.23	55.71	-13.00	-49.25	Horizontal
3	6894.36	-60.16	RMS	35.87	-53.90	0.35	-95.23	52.75	-13.00	-47.16	Horizontal



Site : 03CH01-CA
Condition: -13 3m HORN_02115_230809 Vertical
: LTE Band 4 20M Ch20175 1RB0 QPSK

	Freq	Level	Detector	Ant Factor	Amp\Cb l	Filter	EIRPCF	Readin g	Limit	Margin	Pol
	MHz	dBm		dB/m	dB	dB	dB	dBuV	dBm	dB	
1	3447.18	-42.05	RMS	29.53	-58.33	1.02	-95.23	80.96	-13.00	-29.05	Vertical
2	5170.77	-62.07	RMS	32.97	-56.30	0.49	-95.23	56.00	-13.00	-49.07	Vertical
3	6894.36	-60.35	RMS	35.95	-53.90	0.35	-95.23	52.48	-13.00	-47.35	Vertical

————THE END————