

Test report No: 4393390.54

TEST REPORT

Radio Spectrum Matters (RF)

Identification of item tested	Filter Reading Matte Box System
Trademark	Light Widow LLC
Model and /or type reference	FRS-Light V1
FCC ID	2A8WP-FRSLV1
Contains FCC ID	YCP-STM32WB5M001
Features	Charging input: 5 Vdc Li-ion Battery: 3.7 Vdc
Applicant's name / address	Light Widow LLC 31 Chaparral Circle, Glenwood Springs, Colorado, 81601, USA
Test method requested, standard	FCC CFR Title 47 Part15 Subpart C Section 15.225;
Verdict Summary	COMPLIANCE
Tested by (name & signature)	Jazz Liang 
Approved by (name & signature)	Tim Yan 
Date of issue	2022-09-27
Report template No	TRF_EMC 2017-06-others

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GENERAL CONDITIONS

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.
5. This report will not be used for social proof function in China market.

UNCERTAINTY

For all measurements where guidance for the calculation of the instrumentation uncertainty of a measurement is specified in EN 55016-4-2 (CISPR 16-4-2), EN/IEC 61000-4 series or a product standard, the measurement instrumentation uncertainty has been calculated and applied in accordance with these standards.

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%
Atmospheric pressure	86 kPa – 106 kPa

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not tested	N/T

DEFINITION OF SYMBOLS USED IN THIS TEST REPORT

<input checked="" type="checkbox"/> Indicates that the listed condition, standard or equipment is applicable for this report/test/EUT.			
<input type="checkbox"/> Indicates that the listed condition, standard or equipment is not applicable for this report/test/EUT.			
Decimal separator used in this report	<input checked="" type="checkbox"/>	Comma (,)	<input type="checkbox"/> Point (.)

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	: Equipment Under Test
QP	: Quasi-Peak
CAV	: CISPR Average
AV	: Average
CDN	: Coupling Decoupling Network
SAC	: Semi-Anechoic Chamber
OATS	: Open Area Test Site
BW	: Bandwidth
AM	: Amplitude Modulation
PM	: Pulse Modulation
HCP	: Horizontal Coupling Plane
VCP	: Vertical Coupling Plane
U_N	: Nominal voltage
Tx	: Transmitter
Rx	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report nr.	Date	Description
4393390.54	2022-09-27	First release.

REMARKS AND COMMENTS

The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Description of the item	Filter Reading Matte Box System
Trademark.....	Light Widow LLC
Model / Type number.....	FRS-Light V1
FCC ID	2A8WP-FRSLV1
Hardware	FRSLEB010C
Software.....	N/A
Firmware	3.2.5
Contains FCC ID.....	YCP-STM32WB5M001
Ratings.....	Charging input: 5 Vdc Li-ion Battery: 3.7 Vdc
Manufacturer.....	Same as applicant
Factory	Same as applicant

Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	DC: 5V					
	<input checked="" type="checkbox"/>	Battery: 3.7V					
Mounting position.....	<input type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input checked="" type="checkbox"/>	Hand-held equipment					
	<input type="checkbox"/>	Other:					

Declared by manufacturer, the NFC module is the transceiver which need be provocative.
 the characteristics of NFC module:

Operating Frequency	13.56 MHz	
Operating Temperature Range	-40 – 85 °C	
Modulation	ASK	
Antenna Assembly	Type	Integral
	Gain	2 dBi

The characteristic of wireless chip(BLE mode)

Contains FCC ID.....:	YCP-STM32WB5M001
Operating frequency range(s).....:	2402 MHz – 2480 MHz
Type of Modulation	GFSK
Maximum e.i.r.p	5.9 dBm
Antenna type.....:	Integral Antenna
Operating Temperature Range.....:	-40 – 85 °C
BT version.....:	N/A
Antenna gain.....:	2.0 dBi
Adaptivity/ Non-adaptivity	Adaptivity

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2430	28	2458
1	2404	15	2432	29	2460
2	2406	16	2434	30	2462
3	2408	17	2436	31	2464
4	2410	18	2438	32	2466
5	2412	19	2440	33	2468
6	2414	20	2442	34	2470
7	2416	21	2444	35	2472
8	2418	22	2446	36	2474
9	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454	-	-
13	2428	27	2456	-	-

Intended use of the Equipment Under Test (EUT)

The apparatus as supplied for the test is Filter Reading Matte Box System, which intended for residential use, the product contains electronic control circuitry but without earth connection.

After technical evaluation, model FRS-Light V1 was chosen for full testing.

Copy of marking plate:

No provide.

1.2 Test data

Test Location	DEKRA Testing and Certification (Shanghai) Ltd. Guangzhou Branch Block 5, No.3, Qiyun Road, Huangpu District, Guangzhou, Guangdong, China FCC Designation Number: CN1324;
Date of receipt of test item	2022-08-24
Date (s) of performance of tests	2022-08-24 to 2022-09-20
Test sample	Normal sample: FRS-Light V1 (S/N:C1)

1.3 The environment(s) in which the EUT is intended to be used

The equipment under test (EUT) is intended to be used in the following environment(s):

<input checked="" type="checkbox"/>	Residential (domestic) environment.
<input checked="" type="checkbox"/>	Commercial and light-industrial environment.
<input type="checkbox"/>	Industrial environment.

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Operating mode	Operating mode description	Used for methos	
		Conducted	Radiated
1	NFC transmitting mode	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2		<input type="checkbox"/>	<input type="checkbox"/>
3		<input type="checkbox"/>	<input type="checkbox"/>
4			
Supplemental information: ---			

2.2 Support / Auxiliary equipment / unit / software for the EUT

The EUT has been tested with the following auxiliary equipment / unit / software:

Auxiliary equipment / unit / software	Type / Version	Manufacturer	Supplied by
Mobile phone	Galaxy A02s	SAMSUNG	Client
Adaptor	-	-	DEKRA
Supplemental information: ---			

2.3 Test Configuration / Block diagram used for tests

Refer to Annex 3.

2.4 Measurement procedure

The EUT was controlled by Mobile phone which provided by manufacturer which connected to Mobile phone through the Bluetooth. After connected, run the Apps "LW Cert" supplied by manufacturer to control the EUT work in required test NFC transmitting mode.

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
FCC CFR Title 47 Part 15 Subpart C Section 15.225	2022	Operation within the band 13.110-14.010 MHz.
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

3.3 Overview of results

FCC measurement			
Requirement – Test case	Basic standard(s)	Verdict	Remark
AC Power Line Conducted Emission	FCC 15.207	PASS	---
Radiated Emissions (30MHz-1GHz)	FCC 15.225(d) & 15.209	PASS	---
Radiated Emissions (9kHz-30MHz)	FCC 15.225(d) & 15.209	PASS	---
20dB Bandwidth	FCC 15.215	PASS	---
Emission Mask	FCC 15.225(a)&(b)&(c)	PASS	---
Frequency tolerance	FCC 15.225(e)	PASS	---
Antenna Requirement	FCC 15.203	PASS	---
Supplementary information: ---			

The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to calculate the uncertainty associated with the measurement result.

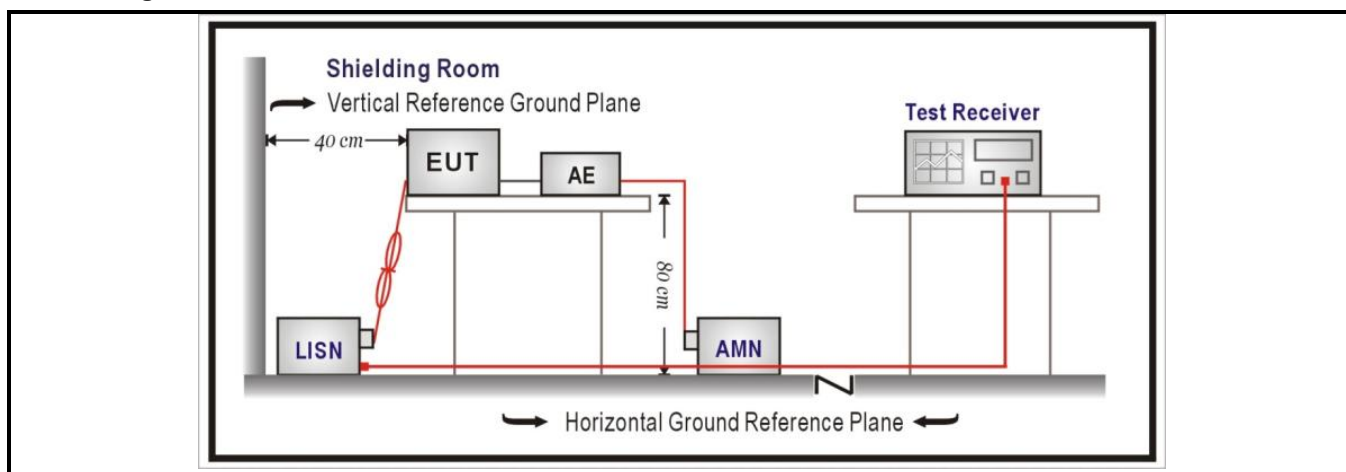
4 TRANSMITTER TEST RESULTS

4.1 AC Power Line Conducted Emission	VERDICT: PASS
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Limits

FCC Part 15 Subpart C Paragraph 15.207				
Frequency range [MHz]	Limit: QP [dB(μV) ¹⁾]	Limit: AV [dB(μV) ¹⁾]	IF BW	Detector(s)
0,15 - 0,50	66 - 56 ²⁾	56 - 46 ²⁾	9 KHz	QP, AV
0,50 - 5,0	56	46	9 KHz	QP, AV
5,0 - 30	60	50	9 KHz	QP, AV
¹⁾ At the transition frequency, the lower limit applies. ²⁾ The limit decreases linearly with the logarithm of the frequency.				

Test Configuration



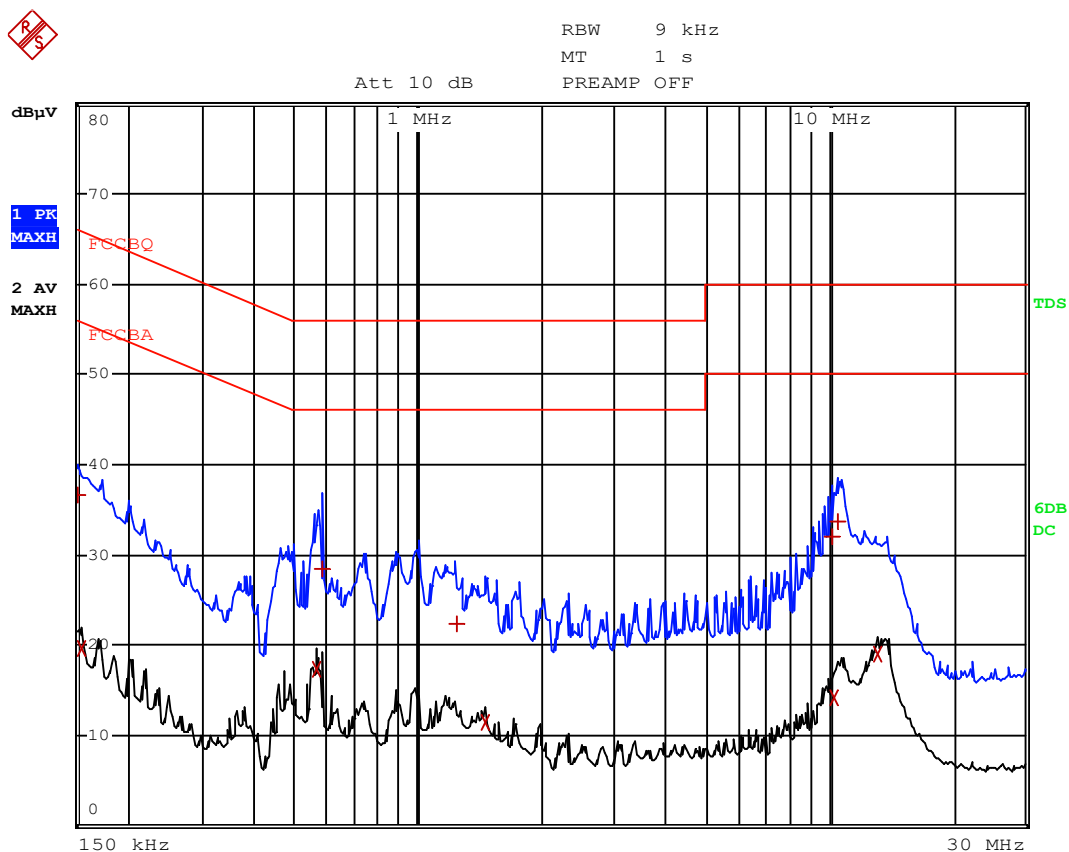
Performed measurements

Port under test		Terminal							
<input checked="" type="checkbox"/>	AC mains input power	<input checked="" type="checkbox"/>	N	<input checked="" type="checkbox"/>	L1	<input type="checkbox"/>	L2	<input type="checkbox"/>	L3
<input type="checkbox"/>	DC input power	<input type="checkbox"/>	Positive (+)			<input type="checkbox"/>	Negative (-)		
Test method applied		<input checked="" type="checkbox"/>	Artificial mains network						
		<input type="checkbox"/>	Voltage probe						
Test setup		<input checked="" type="checkbox"/>	Table top	<input type="checkbox"/>	Artificial hand applied				
		<input type="checkbox"/>	Floor standing	<input type="checkbox"/>	Other:				
		Refer to the Annex 2 for test setup photo(s).							
Operating mode(s) used		Mode 1							
Envirment condition (temperature; humidiry)		23,0 °C; 45,0 %							
Remark		---							

Operation Mode (worst case)	Mode 1(test with adaptor)
Test voltage	120 Vac, 60 Hz

Results

Live



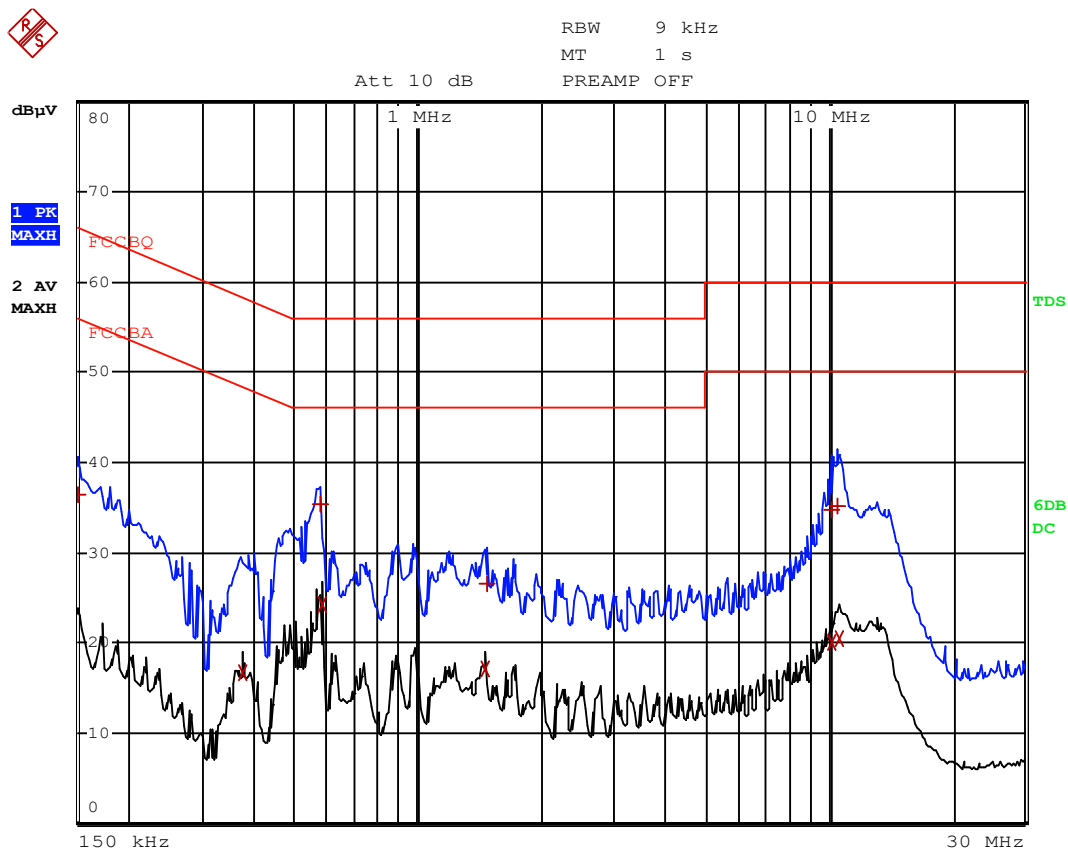
EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCCBQ		
Trace2:	FCCBA		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Quasi Peak	10.494 MHz	33.74	-26.25
1 Quasi Peak	582 kHz	28.43	-27.56
1 Quasi Peak	10.222 MHz	32.12	-27.87
2 Average	566 kHz	17.25	-28.75
1 Quasi Peak	150 kHz	36.54	-29.45
2 Average	13.178 MHz	18.91	-31.09
1 Quasi Peak	1.25 MHz	22.41	-33.58
2 Average	1.462 MHz	11.44	-34.55
2 Average	10.298 MHz	14.07	-35.92
2 Average	154 kHz	19.66	-36.11

Remarks:

- 1) Level (final measurement) = received value + transducer (Lisn+cable)
- 2) Delta = Level – Limit

No other significant emissions were measured at the frequency range of interest employing both the QP and AV detectors.

Neutral



EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCCBQ			
Trace2:	FCCBA			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB	
1 Quasi Peak	578 kHz	35.31	-20.68	
2 Average	582 kHz	24.32	-21.68	
1 Quasi Peak	10.55 MHz	35.15	-24.85	
1 Quasi Peak	10.222 MHz	34.68	-25.31	
2 Average	1.462 MHz	17.19	-28.80	
2 Average	10.662 MHz	20.52	-29.47	
1 Quasi Peak	150 kHz	36.51	-29.49	
1 Quasi Peak	1.47 MHz	26.47	-29.52	
2 Average	10.222 MHz	20.10	-29.89	
2 Average	374 kHz	16.76	-31.64	

Remarks:

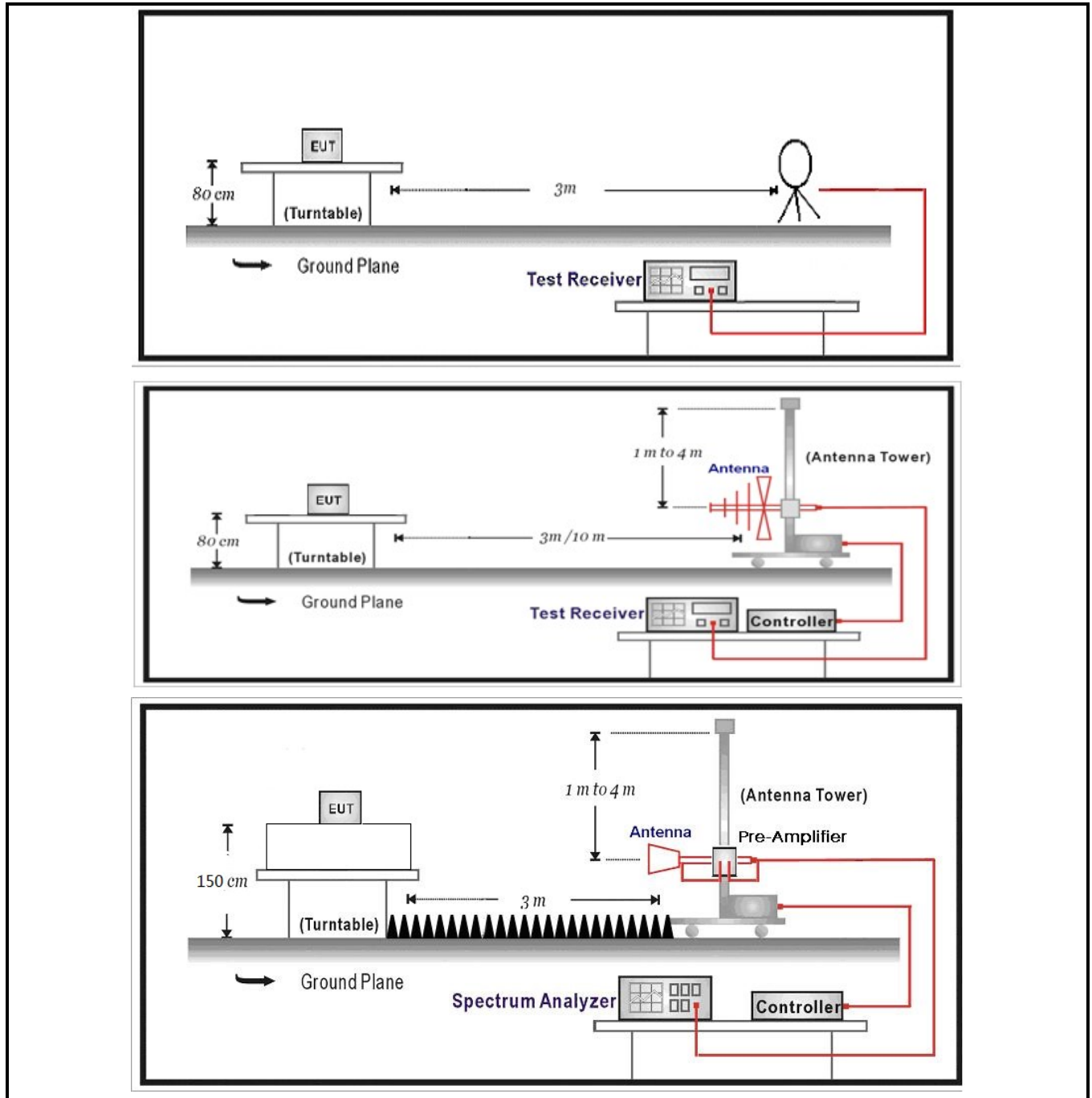
- 1) Level (final measurement) = received value + transducer (Lisn+cable)
- 2) Delta = Level – Limit

No other significant emissions were measured at the frequency range of interest employing both the QP and AV detectors.

4.2	Radidated Emissions	VERDICT: PASS
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Emissions Limit 15.225(d) & 15.209 (a)			
Frequency (MHz)	Field strength (μ V/m)	Field strength (dB μ V/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	-	300 _(Note 1)
0.49 - 1.705	24000/F(kHz)	-	30 _(Note 1)
1.705 - 30	30	-	30 _(Note 1)
30 - 88	100	40	3 _(Note 2)
88 - 216	150	43.5	3 _(Note 2)
216 - 960	200	46	3 _(Note 2)
Above 960	500	54	3 _(Note 2)
<p>Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).</p> <p>Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).</p>			

Test Configuration

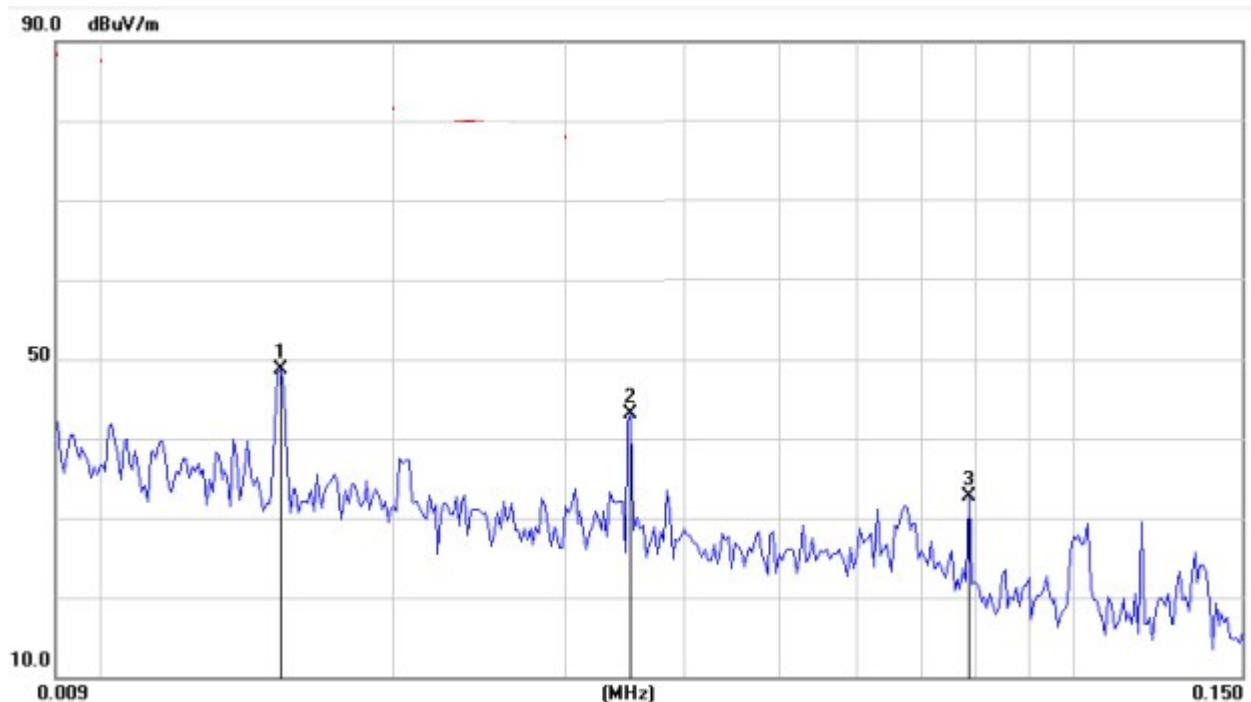


Performed measurements

Port under test	Enclosure port	
Test method applied	<input type="checkbox"/>	Conducted measurement
	<input checked="" type="checkbox"/>	Radiated measurement @3m
Test setup	Refer to the Annex 3 for test setup photo(s).	
Operating mode(s) used	Mode 1	
Remark	<p>1)The test frequency range 1GHz~26GHz, both of the worst case are at least 20dB below the limits, therefore no data appear in the report.</p> <p>2)The EUT are tested in three orientations. The record is the worst orientation which refer to the Annex 3 for test setup photo(s).</p> <p>3)The antenna of NFC incorporates 3 matched antennas. Only ONE antenna can be activated at any given time. The desired antenna is selected using an RF switch in between the antenna and matching circuit.</p>	

Results of 9 – 150 kHz

Operation Mode (worst case)	<p>Mode 1</p> <p>The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.</p> <p>Pre-test NFC antenna 1,2,3, the worst case is antenna 2, which test data was recorded.</p>
Test voltage	3.7 Vdc



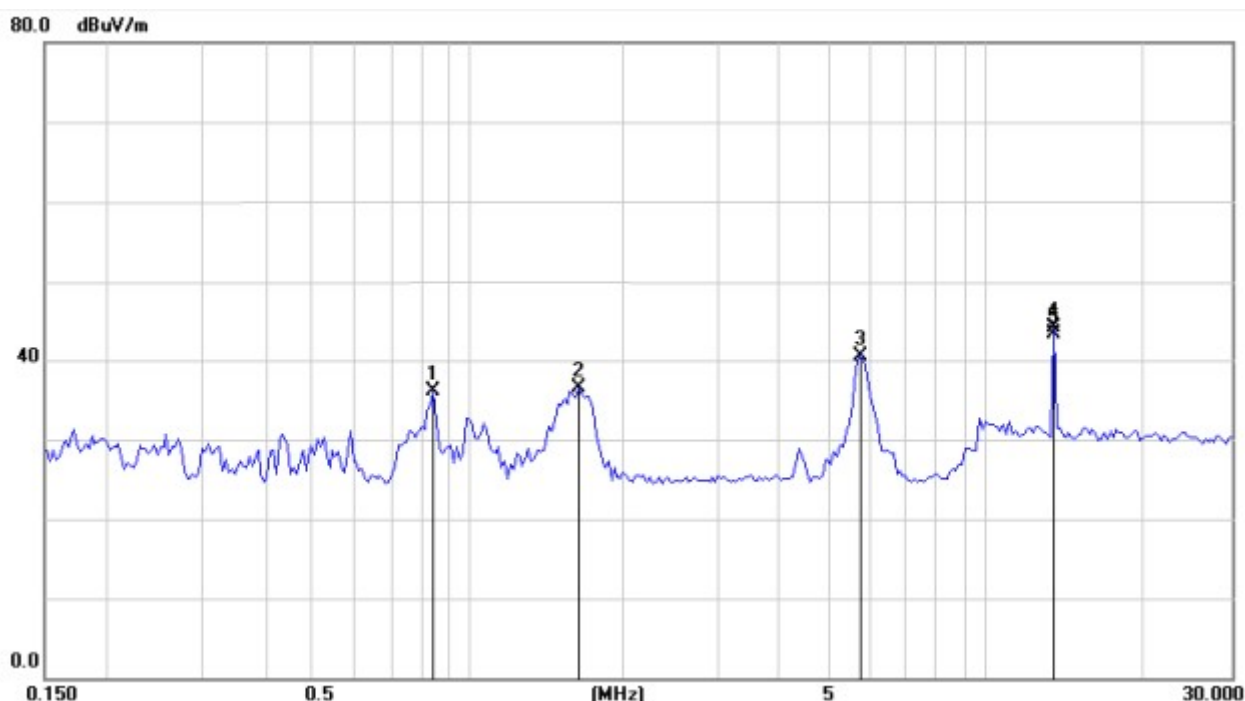
Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)
0.0154	20.03	28.60	48.63
0.0352	20.18	22.91	43.09
0.0785	20.32	12.35	32.67

Remarks: Value = received value + Correction Factor (Antenna factor + Cable loss - Preamp gain)

All the test data below the background of emissions in the frequency band, and the peak field strength of any emission is not exceeding the maximum permitted average limits specified above. So, no limit was shown.

Results of 0.15 – 30 MHz

Operation Mode (worst case)	<p>Mode 1</p> <p>The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.</p> <p>Pre-test NFC antenna 1,2,3, the worst case is antenna 2, which test data was recorded.</p>
Test voltage	3.7 Vdc



Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)
0.8505	20.60	15.52	36.12
1.6275	20.80	15.62	36.42
5.7285	21.03	19.57	40.60
13.5508	21.39	22.76	44.15
13.5509	21.39	21.91	43.30

Remarks: Value = received value + Correction Factor (Antenna factor + Cable loss - Preamp gain)

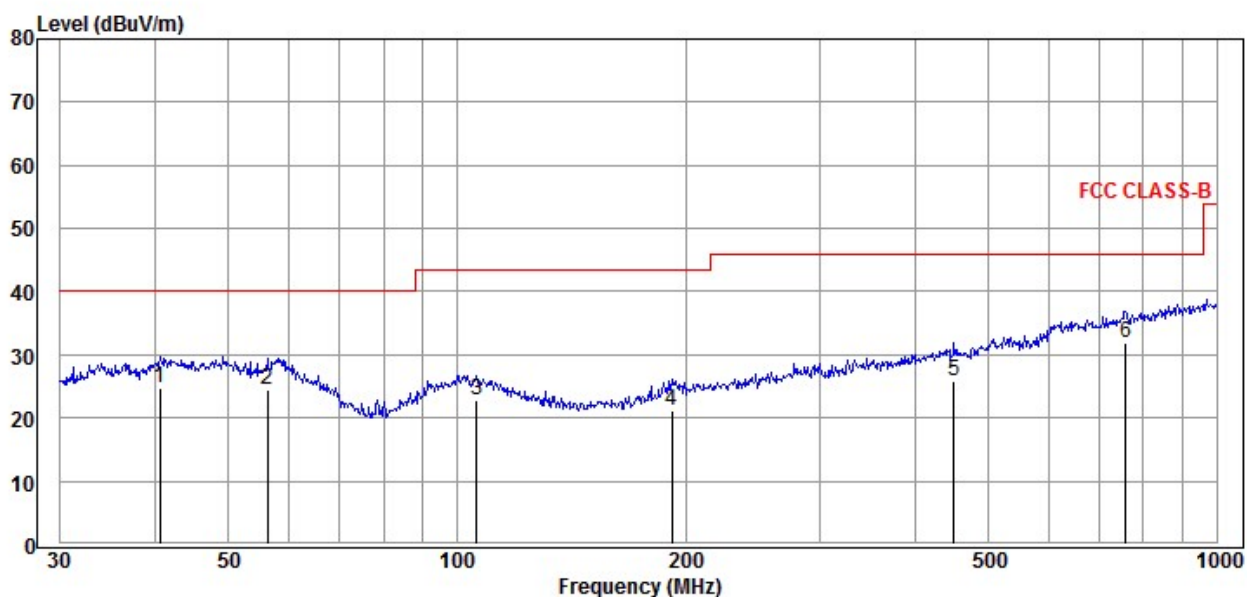
All the test data below the background of emissions in the frequency band, and the peak field strength of any emission is not exceeding the maximum permitted average limits specified above. So, no limit was shown.

Results of 30 – 1000 MHz

Operation Mode	Mode 1 Pre-test NFC antenna 1,2,3, the worst case is antenna 2, which test data was recorded.
Test voltage	3.7 Vdc

Results

Horizontal



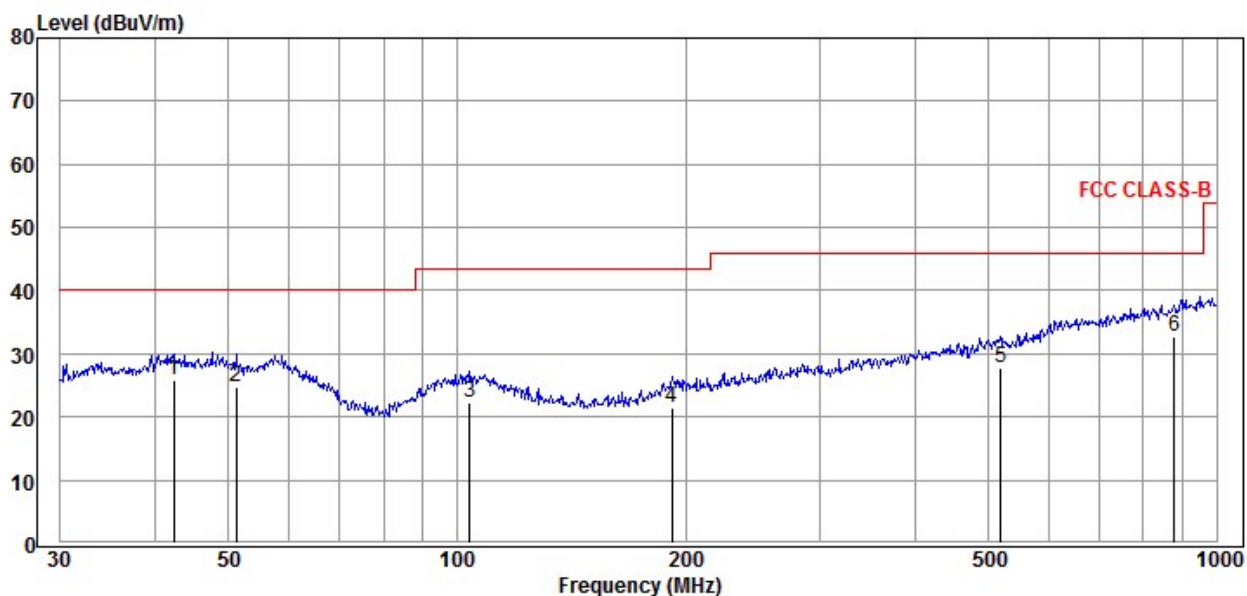
Freq (MHz)	Reading (dBuV)	C.F (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin=limit-result (dB)
40.56	9.70	15.10	24.80	40.00	15.20
56.20	9.47	15.05	24.52	40.00	15.48
106.01	10.12	12.60	22.72	43.50	20.78
191.75	9.18	11.90	21.08	43.50	22.42
451.14	8.82	17.10	25.92	46.00	20.08
758.04	10.43	21.35	31.78	46.00	14.22

Remarks:

- 1) C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain
- 2) Result = Reading + C.F (Correction Factor)

No other significant emissions were measured at the frequency range of interest employing the QP detectors.

Vertical



Freq (MHz)	Reading (dBuV)	C.F (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin=limit-result (dB)
42.30	10.31	15.54	25.85	40.00	14.15
51.12	10.12	14.76	24.88	40.00	15.12
103.81	9.72	12.63	22.35	43.50	21.15
191.75	9.51	11.90	21.41	43.50	22.09
519.07	9.41	18.30	27.71	46.00	18.29
878.32	10.36	22.35	32.71	46.00	13.29

Remarks:

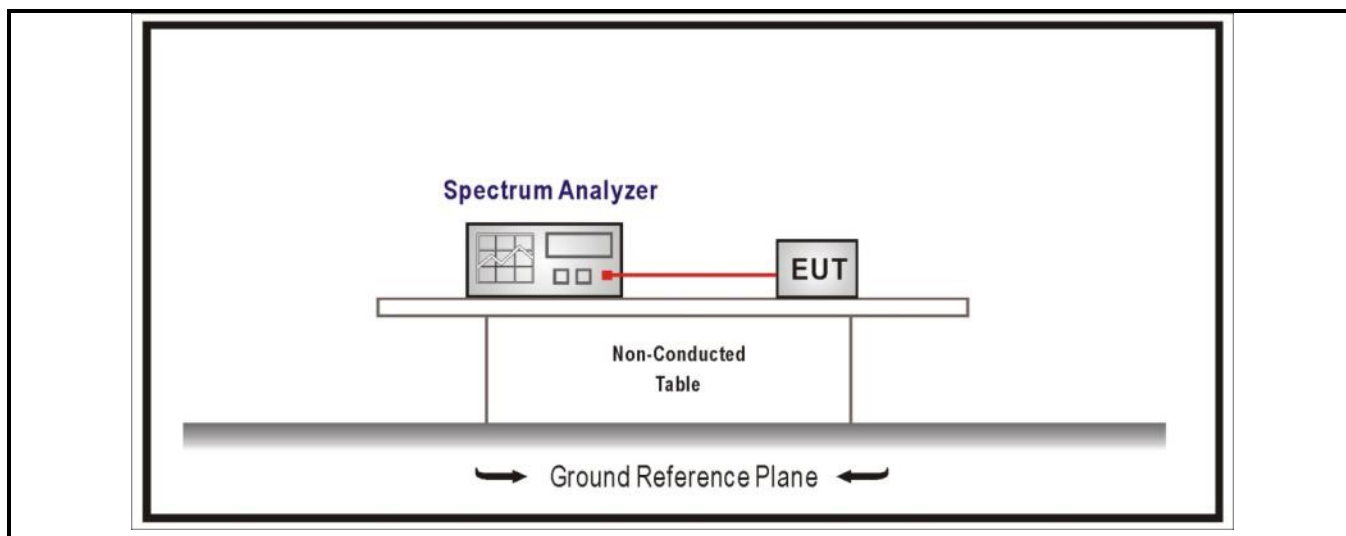
- 1) C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain
- 2) Result = Reading + C.F (Correction Factor)

No other significant emissions were measured at the frequency range of interest employing the QP detectors.

4.3	20dB Bandwidth	VERDICT: PASS
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Standard	FCC Part 15 Subpart C Paragraph 15.215
Limits: 13,553 MHz to 13,567 MHz	

Test Configuration



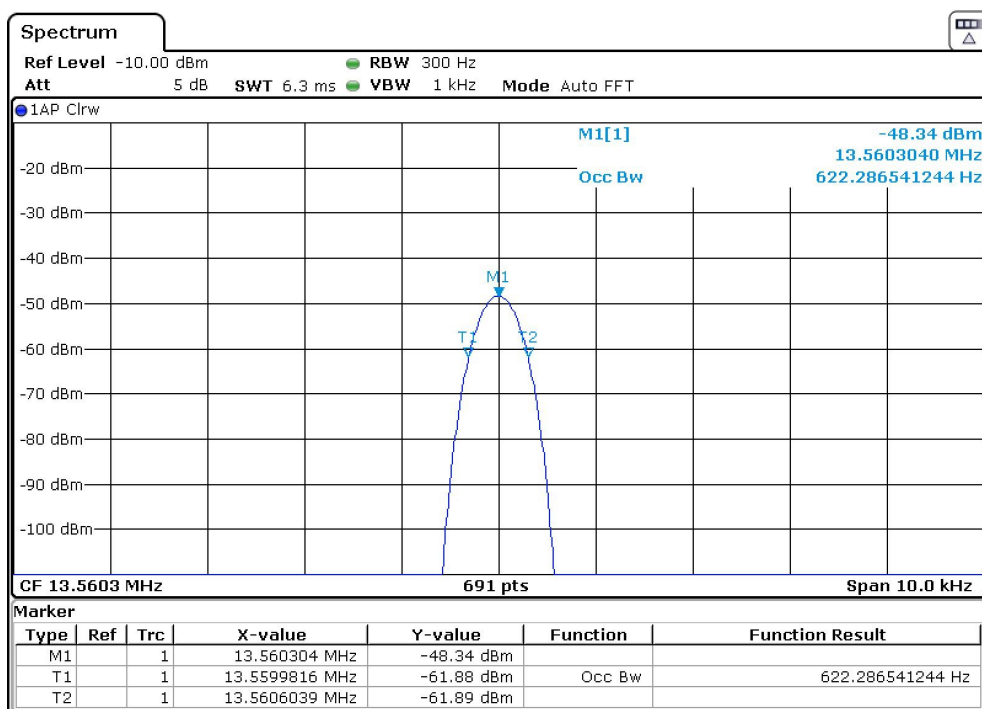
Performed measurements

Port under test	Antenna port	
Test method applied	<input type="checkbox"/>	Conducted measurement
	<input checked="" type="checkbox"/>	Radiated measurement
Test setup	Refer to the Annex 3 for test setup photo(s).	
Operating mode(s) used	Mode 1	
Remark	---	

Results:

Measurement Conditions		Operating frequency	Nominal Operating Frequency	OCW	Limit
T _{normal} (24°C)	V _{norm} : 3.7Vdc	13.56 MHz	13.56 MHz	622Hz	13,553 to 13,567 MHz

Occupancy bandwidth judgment



Visible from the graph: OBW= 622 Hz

4.4 Emission Mask

VERDICT: PASS

Standard

FCC Part 15 Subpart C Paragraph 15.225(a)&(b)&(c)

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Below 30MHz

The test was performed at a 3m test site.

The factor calculated by the following equation:

If both the single point and the limit distance are equal to or closer to the EUT than $\lambda/2\pi$, then extrapolation to the limit distance shall be calculated using Equation (4):

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right) \quad (4)$$

where

FS_{limit}	is the calculation of field strength at the limit distance, expressed in dBμV/m
FS_{max}	is the measured field strength, expressed in dBμV/m
$d_{\text{near field}}$	is the $\lambda/2\pi$ distance
d_{measure}	is the distance of the measurement point from the EUT
d_{limit}	is the reference distance or the distance of the $\lambda/2\pi$ point

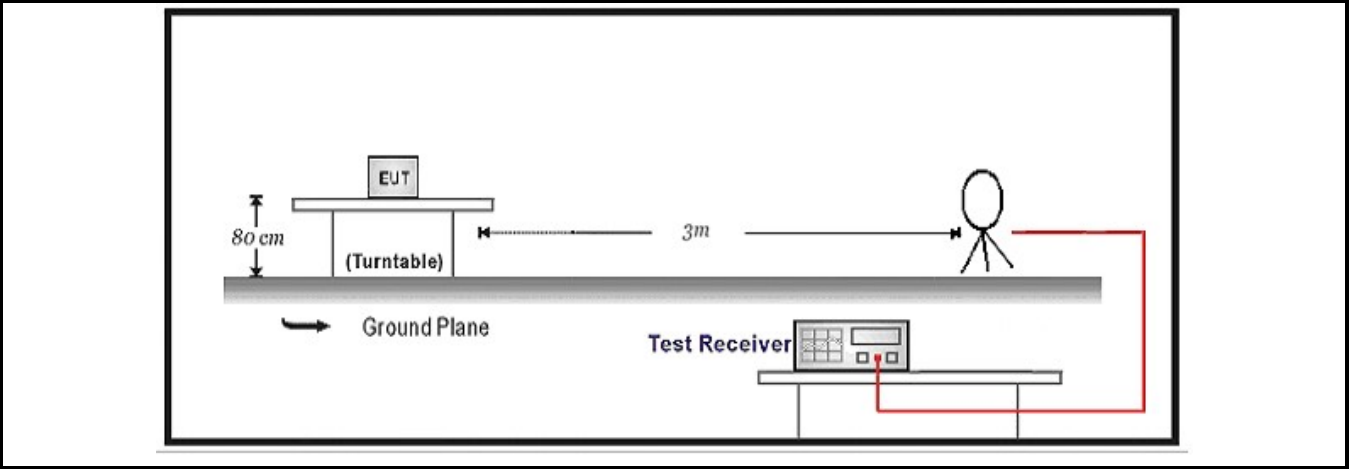
Table 5—Relationship of frequency and wavelength (informative)

Frequency (MHz)	λ (m)	0.625λ (m)	$\lambda/2\pi$
0.009	33333.3	20833.3	5305.2
0.1	3000.0	1875.0	477.5
0.3	1000.0	625.0	159.2
1	300.0	187.5	47.7
4.76	63.0	39.4	10.0
16	18.8	11.7	3.0
30	10.0	6.3	1.6

The limit at 3m test distance is below:

The factor of field strength of any emissions within the band 13.553-13.567 MHz shall be 40 dB at 3 meters.

Test Configuration



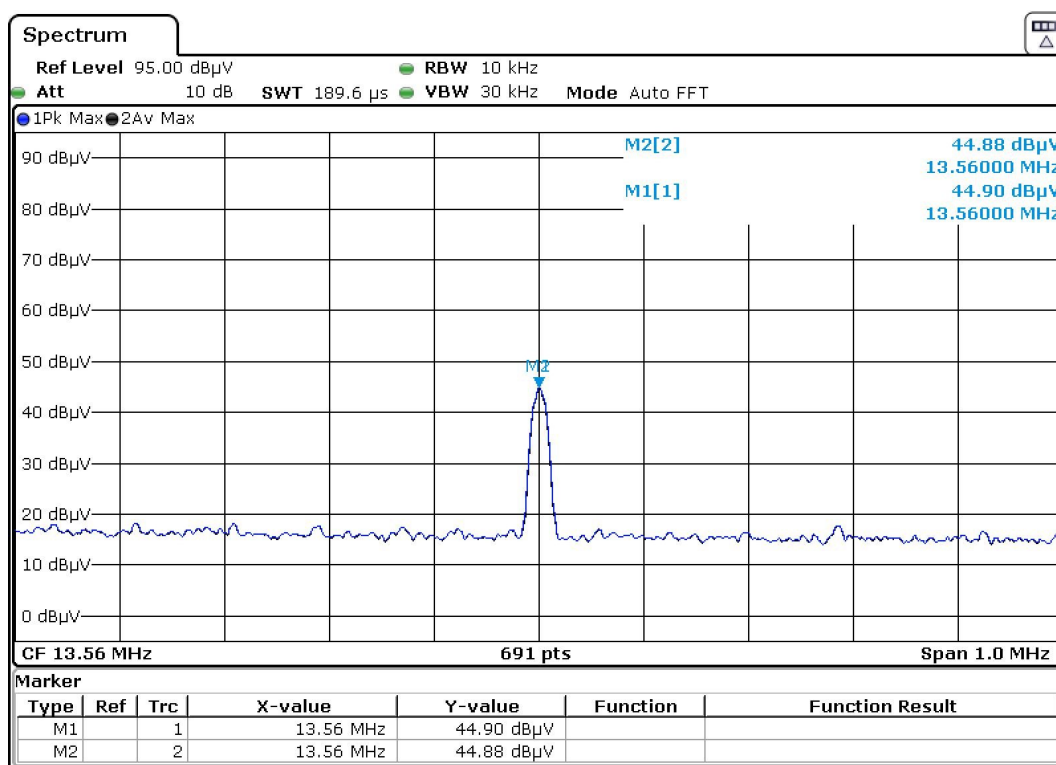
Performed measurements

Port under test	Antenna port	
Test method applied	<input type="checkbox"/>	Conducted measurement
	<input checked="" type="checkbox"/>	Radiated measurement
Test setup	Refer to the Annex 3 for test setup photo(s).	
Operating mode(s) used	Mode 1	
Remark	---	

Results

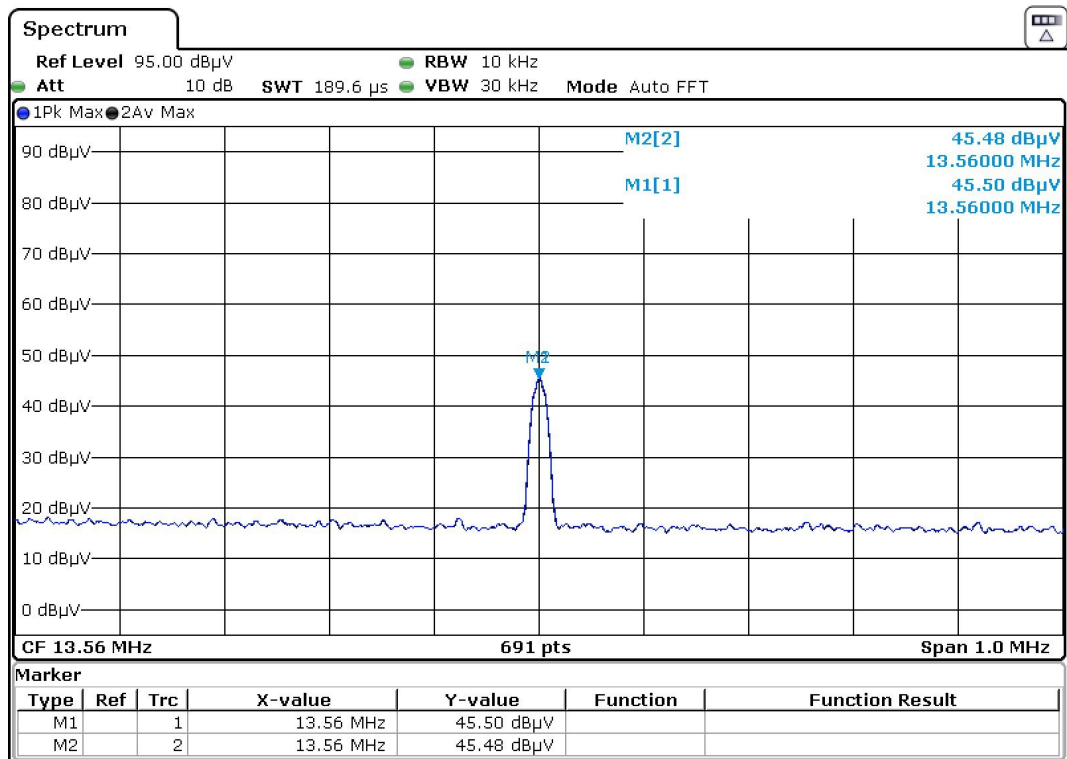
Operation Mode (worst case)	Mode 1 The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test voltage	3.7 Vdc

For antenna 1



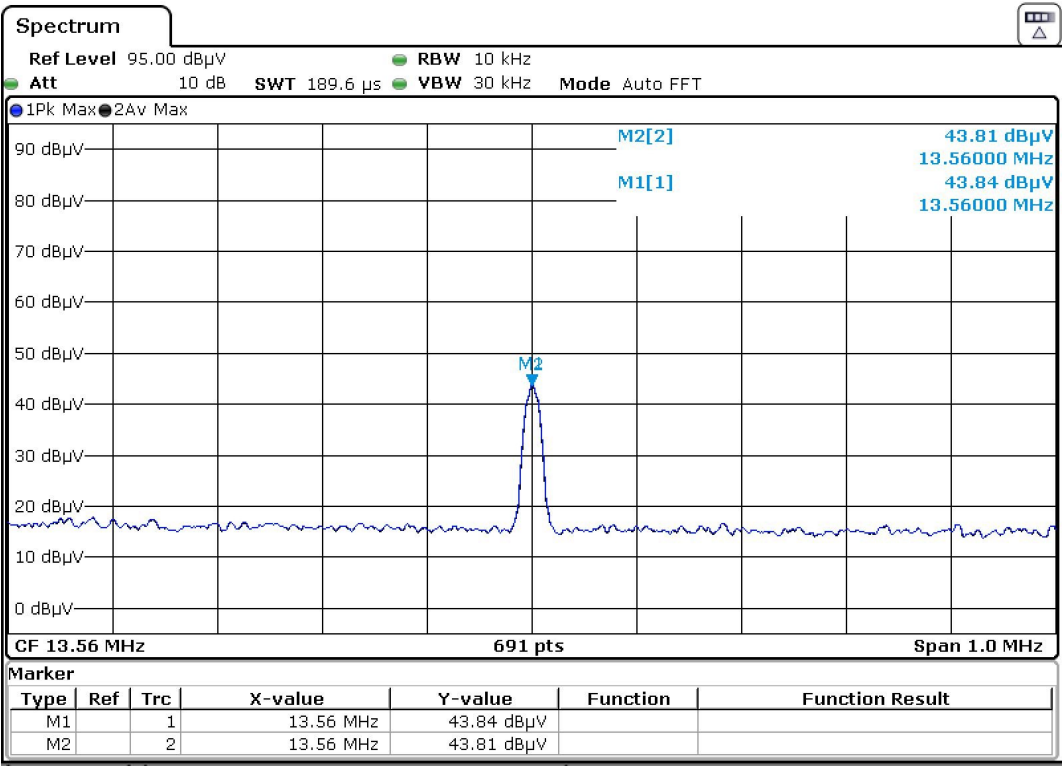
Frequency (MHz)	Results @3m (dBuV/m)	Limit@3m (dBuV/m)	Bands
13,56	44.90	123.99	13.553-13.567 MHz
		90.47	13.410-13.553 MHz and 13.567-13.710 MHz
		80.50	13.110-13.410 MHz and 13.710-14.010 MHz

For antenna 2



Frequency (MHz)	Results @3m (dBuV/m)	Limit@3m (dBuV/m)	Bands
13,56	45.50	123.99	13.553-13.567 MHz
		90.47	13.410-13.553 MHz and 13.567-13.710 MHz
		80.50	13.110-13.410 MHz and 13.710-14.010 MHz

For antenna 3

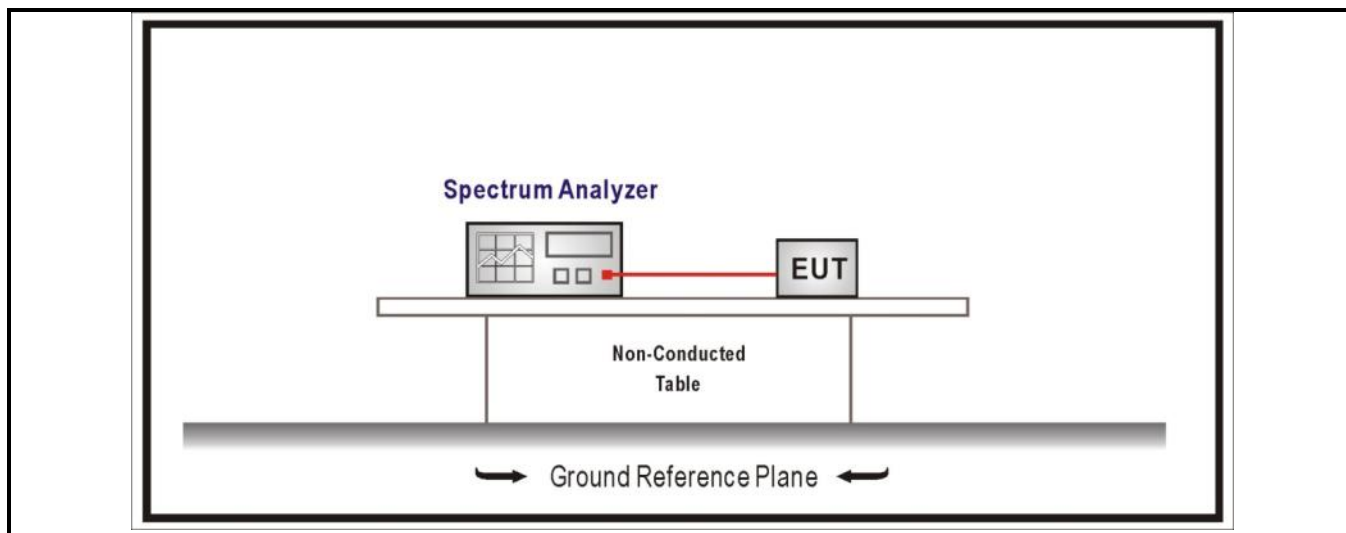


Frequency (MHz)	Results @3m (dBuV/m)	Limit@3m (dBuV/m)	Bands
13,56	43.84	123.99	13.553-13.567 MHz
		90.47	13.410-13.553 MHz and 13.567-13.710 MHz
		80.50	13.110-13.410 MHz and 13.710-14.010 MHz

4.5	Frequency tolerance	VERDICT: PASS
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Standard	FCC Part 15 Subpart C Paragraph 15.225(e)
Limit: $\pm 0.01\%$(1.356kHz)	

Test Configuration



Performed measurements

Port under test	Antenna port	
Test method applied	<input type="checkbox"/>	Conducted measurement
	<input checked="" type="checkbox"/>	Radiated measurement
Test setup	Refer to the Annex 3 for test setup photo(s).	
Operating mode(s) used	Mode 1	
Remark	---	

Results

At startup:

Measurement Conditions		Limit: $\pm 0.01\%$ (1.356kHz)		Result
Voltage (V DC)	Temperature (°C)	Frequency Measured (MHz)	Deviation (kHz)	
V _{norm} : 3.7	-20	13.561344	-0.0145	PASS
	-10	13.561341	-0.0147	PASS
	0	13.561493	-0.0035	PASS
	+10	13.561425	-0.0086	PASS
	T _{normal} : +20	13.561541	-	-
	+30	13.561439	-0.0075	PASS
	+40	13.561400	-0.0104	PASS
	+50	13.561451	-0.0066	PASS
V _{max} : 4.255	T _{normal} : +20	13.561343	-0.0146	PASS
V _{min} : 3.145		13.561355	-0.0137	PASS

At 10 minutes later:

Measurement Conditions		Limit: $\pm 0.01\%$ (1.356kHz)		Result
Voltage (V DC)	Temperature (°C)	Frequency Measured (MHz)	Deviation (kHz)	
V _{norm} : 3.7	-20	13.561277	-0.0192	PASS
	-10	13.561141	-0.0292	PASS
	0	13.561258	-0.0206	PASS
	+10	13.561123	-0.0305	PASS
	T _{normal} : +20	13.561537	-	-
	+30	13.561340	-0.0145	PASS
	+40	13.561567	0.0022	PASS
	+50	13.561532	-0.0004	PASS
V _{max} : 4.255	T _{normal} : +20	13.561333	-0.0150	PASS
V _{min} : 3.145		13.561032	-0.0372	PASS

5 IDENTIFICATION OF THE EQUIPMENT UNDER TEST

The photographs show the tested device.

Refer to documents External photo and Internal photo.

ANNEX 1 – MEASUREMENT UNCERTAINTY

Test Item	Uncertainty
Occupied Channel Bandwidth	$\pm 0,7\%$
RF Output power, conducted	$\pm 0,6\text{dB}$
Power Spectral Density, Conducted	$\pm 0,6\text{dB}$
Unwanted Emissions, Conducted	$\pm 0.7\text{dB}$
Spurious (30-1000MHz)	$\pm 4,4\text{dB}$
Spurious (1-12,75GHz)	$\pm 4,4\text{dB}$

ANNEX 2 - USED EQUIPMENT

Continuous disturbances conducted (150 kHz to 30 MHz)

Item	Instrumentation	Manufacturer	Model No.	Serial No.	DEKRA No.	Cal. Due date
1	EMI Receiver	R&S	ESCI	101206	G/L858	2023/07/21
2	LISN	R&S	ENV216	101336	G/L859	2023/07/21
3	Shielding Room	Changzhou Feite	/	/	G/L861	2023/06/17

Emissions in non-restricted frequency bands/ Emissions in restricted frequency bands

Item	Instrumentation	Manufacturer	Model No.	Serial No.	DEKRA No.	Cal. Due date
1	EMI receiver	R&S	ESCI	101205	G/L857	2023/07/21
2	Antenna (30MHz-3GHz)	SCHWARZBECK	VULB9163	506	G/L864	2022/10/26
3	Chamber	ETS	/	/	G/L856	2024/06/10
4	Antenna (1GHz-18GHz)	R&S	HF907	102306	G/L1236	2023/02/23
5	Horn antenna preamplifier	Schwarzbeek	SCU-18	102234	G/L1236-1	2023/02/21
6	Spectrum analyzer	R&S	FSV	SN101012	G/L1235	2023/01/17
7	HF antenna (18 – 26.5 GHz)	ETS	3160-09	00164643	G/L1237	2023/01/16
8	High frequency antenna preamplifier (18 – 26.5 GHz)	Schwarzbeck	SCU-26	1879064	G/L1237-1	2023/01/10
9	Broadband horn antenna (15 – 40 GHz)	Schwarzbeck	BBHA9170	00908	GZ1901	2023/05/06
10	High frequency antenna preamplifier (18 – 26.5 GHz)	Schwarzbeck	SCU-26	1879064	G/L1237-1	2023/01/10
11	Annular magnetic field antenna	TESEQ	HLA6121	540045	GZ1905	2023/05/12

Duty cycle/Band Edge/Fundamental emission output power/DTS Bandwidth/Power Spectral Density

Item	Instrumentation	Manufacturer	Model	Serial no.	DEKRA No.	Cal Due date
1	Spectrum analyzer	R&S	FSV	SN101012	G/L1235	2023/01/17
2	Chamber	ETS	/	/	G/L856	2024/06/10
3	OSP	R&S	OSP 150	101907	GZ1894	2023/04/27

ANNEX 3 - TEST PHOTOS

Refer to document Test setup.

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