



TEST REPORT

REPORT NUMBER: I23W00037-NFC

ON

Type of Equipment: Separate Monitor

Type of Designation: NP511, NP512

Brand Name: SUNMI

Manufacturer: Shanghai Sunmi Technology Co.,Ltd.

FCC ID 2AH25NP

IC 22621-NP

ACCORDING TO

FCC CFR47 Part 2, FCC CFR47 Part 15C, ANSI C63.10-2013, RSS-210 Issue 10, RSS-Gen Issue 5

Chongqing Academy of Information and Communications Technology

Month date, year

August 29, 2023

Signature

Xiang Luoyong

Director

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of Chongqing Academy of Information and Communications Technology.



Report No.: I23W00037-NFC

Revision Version

Report Number	Revision	Date
I23W00037-NFC	00	2023-08-29

Chongqing Academy of Information and Communication Technology

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1. Test Laboratory

1.1. Testing Location

Name:	Chongqing Academy of Information and Communications Technology
FCC Registration Number:	CN1239
IC RegistrationNumber:	29397
Address:	No.19 East Road, Xiantao Big-data Valley, Yubei District, Chongqing, People' s Republic of China
Postal Code:	401336
Telephone:	0086-23-88069965
Fax:	0086-23-88608777

1.2. Testing Environment

Normal Temperature:	15-35°C
Relative Humidity:	25-75%RH

1.3. Project data

Testing Start Date:	2023-08-17
Testing End Date:	2023-08-17

1.4. Signature



2023-08-29

Li Runhao
(Prepared this test report)

Date



2023-08-29

Xiao Yu
(Reviewed this test report)

Date



2023-08-29

Xiang Luoyong Director of the
laboratory (Approved this test report)

Date

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2. Client Information

2.1. Applicant Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address /Post:	Room 505, No.388, Song Hu Road, Yang Pu District, Shanghai, China
City:	Shanghai
Country:	China
Telephone:	+86 17302160204
Fax:	N/A
Email:	minfei.chen@sunmi.com
Contact Person:	Chen Minfei

2.2. Manufacturer Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address /Post:	Room 505, No.388, Song Hu Road, Yang Pu District, Shanghai, China
City:	Shanghai
Country:	China
Telephone:	+86 17302160204
Fax:	N/A
Email:	minfei.chen@sunmi.com
Contact Person:	Chen Minfei

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3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	Separate Monitor
Model name	NP511, NP512
Brand name	SUNMI

Note: Photographs of EUT are shown in ANNEX B of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
S1	MS04D36S40036	2.0.B	1.0.0	2023-07-20
S2	MS02D36T40091	2.0.B	1.0.0	2023-07-20

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	dB*
CB04	Adapter	CYZSE65-240250
UE01	AC Cable	N/A
AE1	Type-A Card	N/A
AE2	POS System	L15A1
AE3	NFC Test Software	NFC Polling Monitor

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC CFR47 Part 2	Frequency allocations and radio treaty matters; general rules and regulations	October 01, 2020
FCC CFR47 Part 15C	Radio Frequency Devices-Intentional Radiators	2020
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
RSS-210	License-Exempt Radio Apparatus: Category I Equipment	Issue 10
RSS-Gen	General Requirements for Compliance of Radio Apparatus	Issue 5

5. Test Equipment Utilized

No.	Equipment	Model	SN	HW Version	SW Version	Manuf acture	Cal. Interval	Cal.Due Date
1	Test Receiver	ESR 3	101382	03	3.48 SP2	R&S	1 Year	2023-01-29
								2024-01-28
2	Test Receiver	ESW 26	101382	00	1.50 SP1	R&S	1 Year	2023-06-29
								2024-06-28
3	Ultra- wideband Log Periodic Antenna	VULB9163	9163-586	--	--	Schwarz beck	2 Years	2022-10-29
								2023-10-29
4	Double Ridged Guide Antenna	9120D	1083	--	--	R&S	2 Years	2024-12-14
								2024-12-14
5	2-Line V- Network	ENV216	102368	--	--	R&S	1 Year	2023-05-28
								2024-05-27
6	Test Receiver	ESU 40	100350	01	4.43 SP3	R&S	1 Year	2023-06-29
								2024-06-28
7	Loop Antenna	6502	00213256	--	--	ETS	1 Year	2023-05-16
								2024-05-15
8	Spectrum analyzer	FSQ 26	201137/02 6	--	--	R&S	1 Year	2023-06-29
								2024-06-28

Test software

No.	Name	version	SN	Manufacture
1	EMC32 (RE Below 1GHz)	V9.26.01	--	R&S
2	EMC32 (RE Above 1GHz)	V 10.20.01	--	R&S
3	EMC32 (CE)	V 10.40.10	--	R&S

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6. Test Results

6.1. Summary of Test Results

Sub-clause of FCC Standard	Sub-clause of IC Standard	Name of Test	Result												
2.1049	RSS-Gen 6.7	20 dB bandwidth	Pass												
15.225(e)	RSS-210 B.6.b	Frequency Stability	Pass												
15.225 (a) (b) (c) (d) and 15.209	RSS-210 B.6.a (i , ii , iii , iv)	Radiated Emission	Pass												
15.207	RSS-Gen 8.8	Conducted Emissions	Pass												
N/A	RSS-Gen 6.7	Occupied bandwidth	Pass												
Note: N/A means not applicable. The NP511, NP512, manufactured by Shanghai Sunmi Technology Co.,Ltd. is a new product for testing. There are two configurations S1 Main Supply (Large Screen) & S2 Secondary Supply (Little Screen). We mainly tested the configuration main supply, and the other configuration tested the worst mode of the main supply, and recorded the test results of the worst respectively in the report. The description of the differences between S1 and S2 is as follows. <table border="1"> <tr> <th>EUT ID</th><th>SN or IMEI</th><th>Model</th><th>LCD</th></tr> <tr> <td>S1</td><td>MS02D36T40091</td><td>NP512</td><td>15.6'</td></tr> <tr> <td>S2</td><td>MS04D36S40036</td><td>NP511</td><td>10.1'</td></tr> </table>				EUT ID	SN or IMEI	Model	LCD	S1	MS02D36T40091	NP512	15.6'	S2	MS04D36S40036	NP511	10.1'
EUT ID	SN or IMEI	Model	LCD												
S1	MS02D36T40091	NP512	15.6'												
S2	MS04D36S40036	NP511	10.1'												

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7. Test Results

7.1. 20 dB bandwidth

S1 (Main supply)

Specifications:	2.1049 & RSS-Gen 6.7
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.4°C Relative Humidity:53.4% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

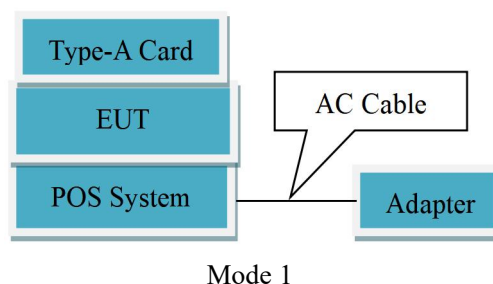
S2 (Secondary supply)

Specifications:	2.1049 & RSS-Gen 6.7
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.4°C Relative Humidity:53.4% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

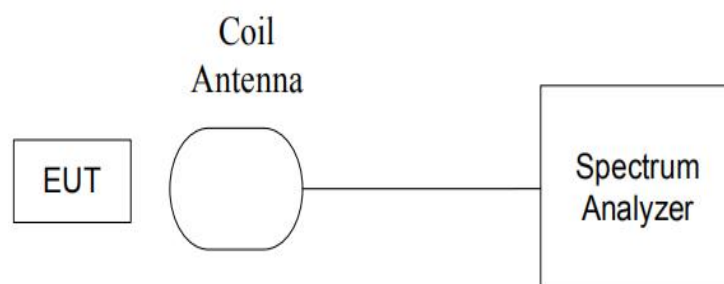
Limit/Criterion:

The 20dB bandwidth shall be less than 80% of the permitted frequency band. For 13.56MHz NFC, the permitted frequency band is 14kHz, so the limit is 11.2kHz.

EUT Setup:



EUT Connection Diagram of Test System



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Test Method:

- a. The transmitter output signal was picked up by coil antenna to the spectrum analyzer.
- b. The transmitter output signal was picked up by coil antenna connected to the spectrum analyzer.
- c. The bandwidth of the center frequency was measured with 200Hz RBW, 500Hz VBW and 14kHz span.

Uncertainty Measurement:

The measurement uncertainty is 70.06Hz (k=2)

Test Condition:

The measurement of EUT is carried out under the transmit state of NFC and without modulation.

EUT had been not connected to a travel adapter.

During the measurements, the ambient temperature is in the range of 15~25°C.

Test Result:**Main supply S1:**

Carrier frequency (MHz)	20dB Bandwidth (kHz)	Test Results	Conclusion
13.56	0.583	See Figure 7.1.1	Pass

Secondary supply S2:

Carrier frequency (MHz)	20dB Bandwidth (kHz)	Test Results	Conclusion
13.56	0.561	See Figure 7.1.2	Pass

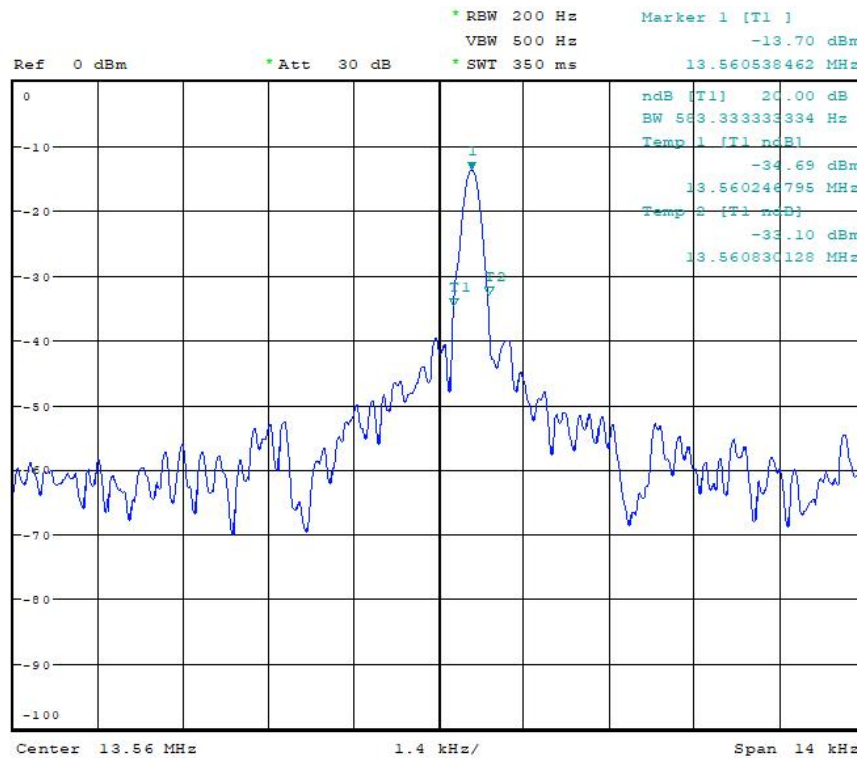


Figure 7.1.1 Mode 1 20Db Bandwidth _ S1 Main Supply

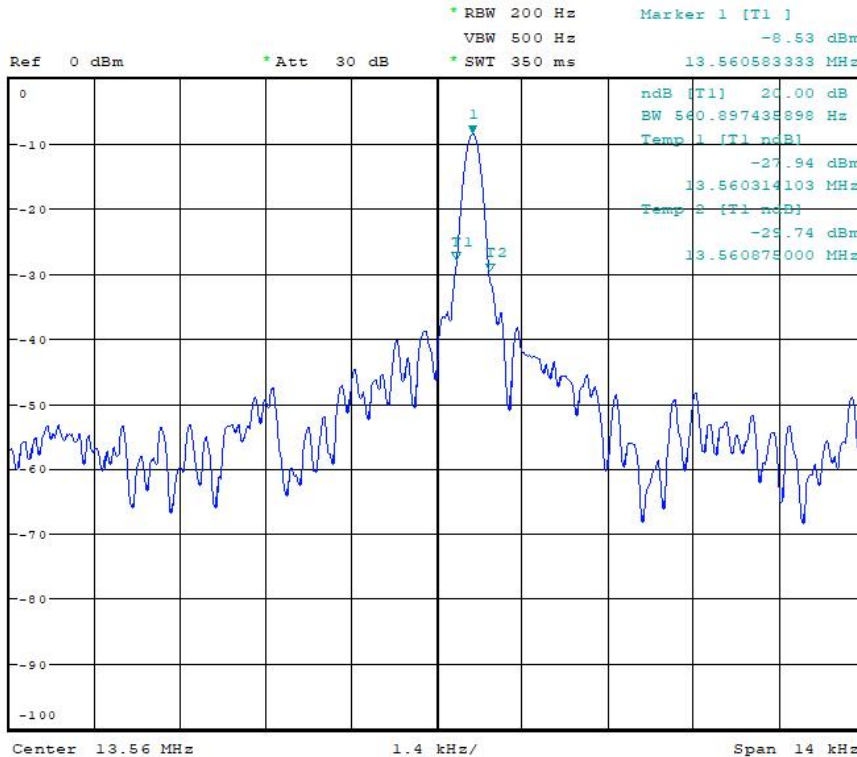


Figure 7.1.2 Mode 1 20Db Bandwidth _ S2 Secondary Supply

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7.2. Frequency Stability

S1 (Main supply)

Specifications:	15.225(e) & RSS-210 B.6.b
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.4°C Relative Humidity:53.4% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

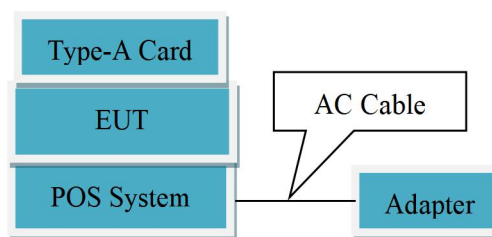
S2 (Secondary supply)

Specifications:	15.225(e) & RSS-210 B.6.b
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.4°C Relative Humidity:53.4% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

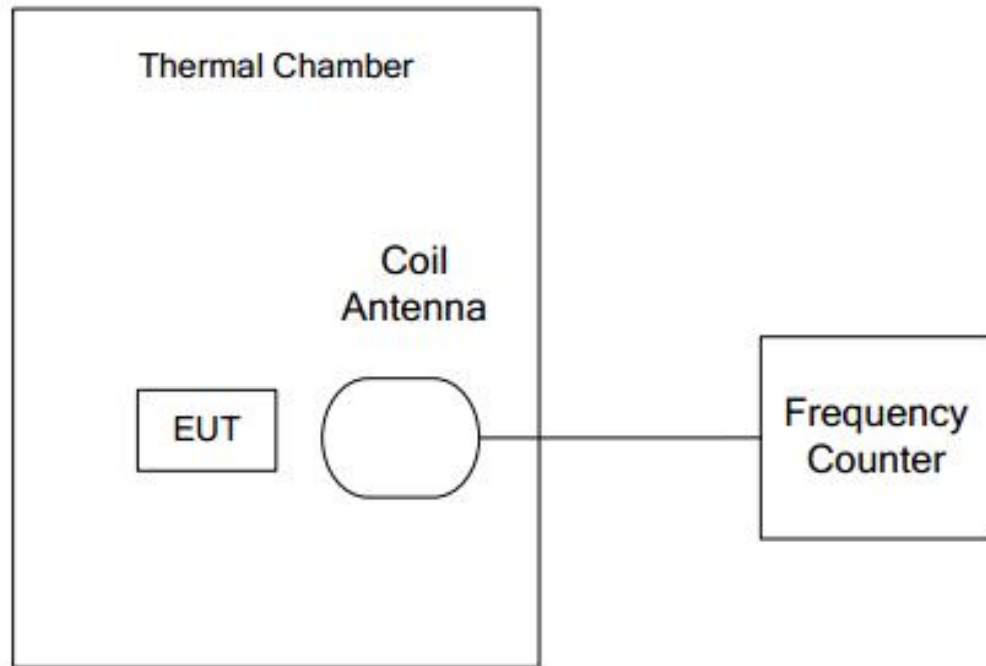
Limit/Criterion:

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency.

EUT Setup:



Mode 1

EUT Connection Diagram of Test System**Test Method:**

The transmitter output signal was picked up by coil antenna connected to the frequency counter. The center frequency was measured with 30Hz RBW and 1kHz span.

During the test, the EUT was placed in a thermal chamber until thermal balance and lasting appropriate time.

Uncertainty Measurement:

The measurement uncertainty $U=1.44\text{Hz}(k=2)$.

Test Condition:

The measurement of EUT is carried out under the transmit state of without modulation, EUT1 had been not connected to a travel adapter.

Operation Temperature: $T_{\min}=-20^{\circ}\text{C}$, $T_{\text{nom}}=25^{\circ}\text{C}$, and $T_{\max}=50^{\circ}\text{C}$

Operation Voltage: $V_{\min}=22.8\text{V}$, $V_{\max}=25.2\text{V}$, and $T_{\text{nom}}=24\text{V}$.

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Test Result:
Main supply_S1:

Temperature	Voltage	Frequency Error (MHz)			
		Startup	2Min Later	5Min Later	10Min Later
Tmin	Vnom	13.560538	13.560516	13.560419	13.560431
Tmax	Vnom	13.560482	13.560485	13.560437	13.560483
Tnom	Vnom	13.560462	13.560460	13.560464	13.560464
Tnom	Vmin	13.560438	13.560462	13.560451	13.560420
Tnom	Vmax	13.560449	13.560451	13.560436	13.560536
Tmin	Vnom	13.560538	13.560516	13.560419	13.560431
Temperature	Voltage	Frequency Error (%)			
Tmin	Vnom	0.004	0.004	0.003	0.003
Tmax	Vnom	0.003	0.003	0.003	0.003
Tnom	Vnom	0.003	0.003	0.003	0.003
Tnom	Vmin	0.003	0.003	0.003	0.003
Tnom	Vmax	0.003	0.003	0.003	0.004
Tmin	Vnom	0.004	0.004	0.003	0.003

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Secondary supply S2:

Temperature	Voltage	Frequency Error (MHz)			
		Startup	2Min Later	5Min Later	10Min Later
Tmin	Vnom	13.560583	13.560413	13.560403	13.560461
Tmax	Vnom	13.560400	13.560585	13.560422	13.560483
Tnom	Vnom	13.560423	13.560466	13.560439	13.560467
Tnom	Vmin	13.560418	13.560441	13.560421	13.560420
Tnom	Vmax	13.560569	13.560421	13.560435	13.560538
Tmin	Vnom	13.560583	13.560413	13.560403	13.560461
Temperature	Voltage	Frequency Error (%)			
		Startup	2Min Later	5Min Later	10Min Later
Tmin	Vnom	0.004	0.003	0.003	0.003
Tmax	Vnom	0.003	0.004	0.003	0.003
Tnom	Vnom	0.003	0.003	0.003	0.003
Tnom	Vmin	0.003	0.003	0.003	0.003
Tnom	Vmax	0.004	0.003	0.003	0.004
Tmin	Vnom	0.004	0.003	0.003	0.003

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7.3. Radiated Emission

7.3.1 Electric Field Strength of Fundamental Emissions

S1 (Main supply)

Specifications:	15.225 (a) (b) (c) (d) and 15.209 & RSS-210 B.6.a (i , ii , iii , iv)
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.4°C Relative Humidity:53.4% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

S2 (Secondary supply)

Specifications:	15.225 (a) (b) (c) (d) and 15.209 & RSS-210 B.6.a (i , ii , iii , iv)
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.4°C Relative Humidity:53.4% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

Limit/Criterion:

Clause 15.225(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.

Clause 15.225(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.

Clause 15.225(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.

Frequency Range (MHz)	E-field Strength Limit @30m (uV/m)	E-field Strength Limit @3m (dBuV/m)
13.560 ± 0.007	15848	124
13.410 to 13.553 13.567 to 13.710	334	90
13.110 to 13.410 13.710 to 14.010	106	81
Outside the band 13.110- 14.010	Base on RSS-210 B.6.d, the limit of this range see section 6.3.2.4	

Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula:

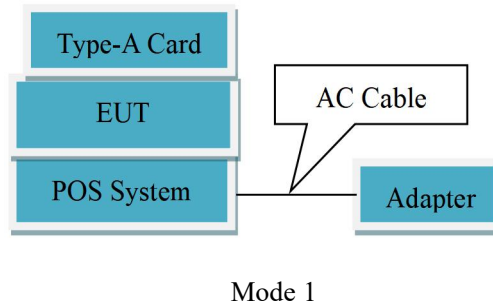
Extrapolation (dB) = 40log10(Measurement Distance / Specification Distance)

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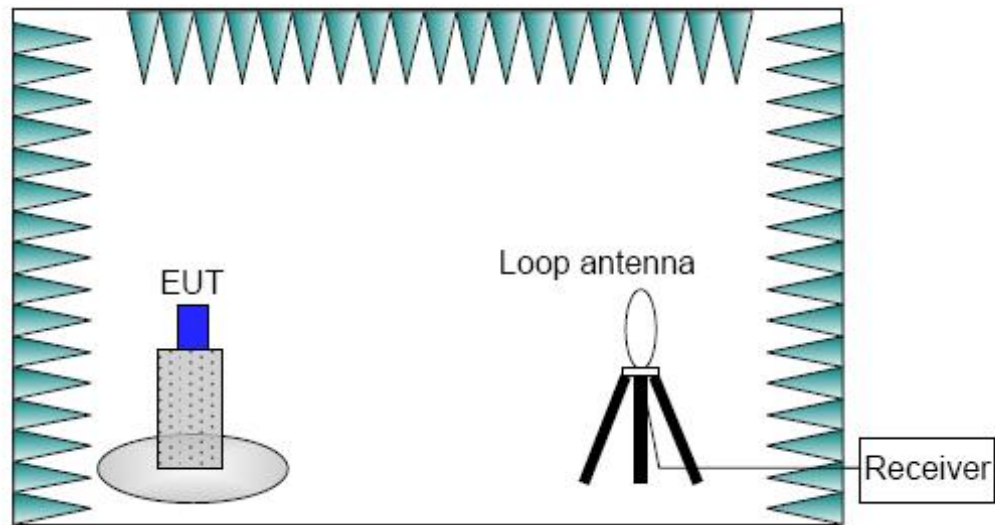
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EUT Setup:



EUT Connection Diagram of Test System



Test Method:

a. The test set-up was made in accordance to the general provisions of ANSI C63.10-2013. The transmitter carrier output levels (E-Field) from the EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving antenna is 1 meter above the ground. The E-field is measured with a shielded loop antenna connected to a measurement receiver. Detected E-field was maximized by rotating the EUT through 360° and adjusting the receiving antenna polarizations. Both horizontal and vertical polarizations of the antenna were set during the measurement. The maximization processes were repeated with the EUT positioned respectively in its three orthogonal axes. The measurements were performed with the peak detector and if required, the quasi-peak detector.

b. The measurement bandwidth:

Frequency (MHz)	RBW / VBW
13.1-14	10 / 30kHz

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Uncertainty Measurement:

The measurement uncertainty $U=4.30\text{dB}(k=2)$.

Test Condition:

Frequency Range (MHz)	RBW/VBW	Sweep Time (s)
13.1-14	10kHz/30kHz	AUTO

Test Result:

Main Supply_S1:

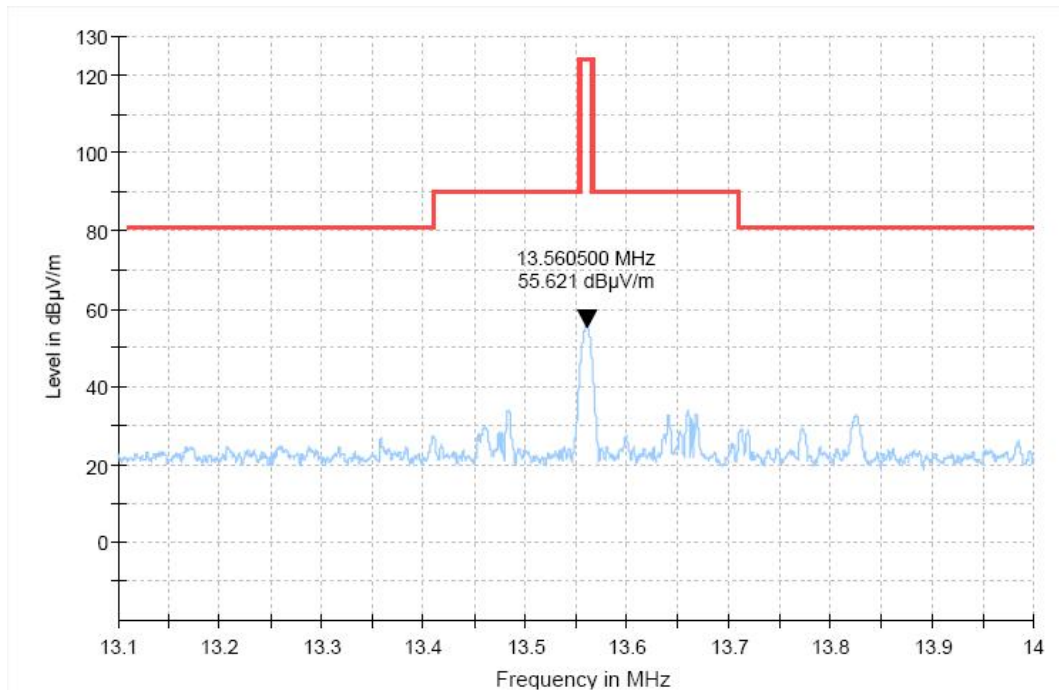


Figure 7.3.1-1 Mode 1 Electric Field Strength of Fundamental Emissions

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Secondary Supply_S2:

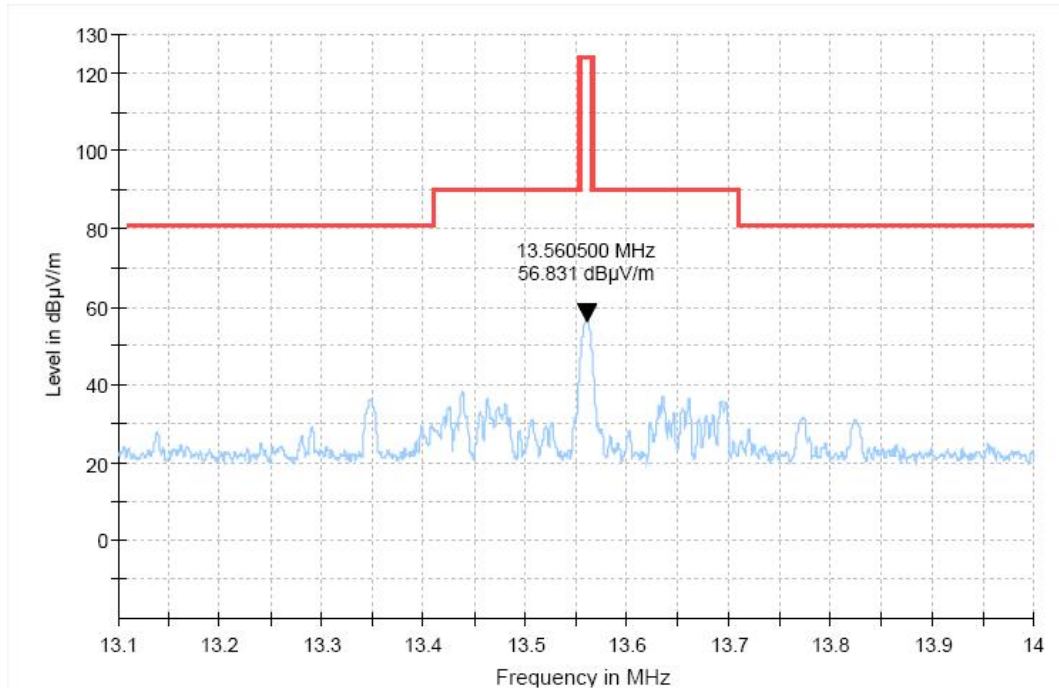


Figure 7.3.1-2 Mode 1 Electric Field Strength of Fundamental Emissions

7.3.2 Electric Field Radiated Emissions (Below 30MHz)

S1 (Main supply)

Specifications:	15.225 (a) (b) (c) (d) and 15.209 & RSS-210 B.6.a (i , ii , iii , iv)
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.4°C Relative Humidity:53.4% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

S2 (Secondary supply)

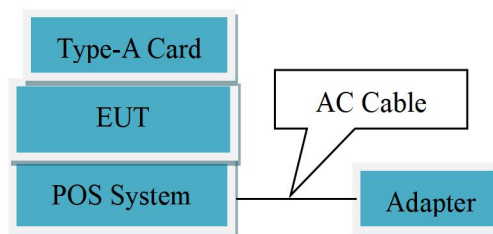
Specifications:	15.225 (a) (b) (c) (d) and 15.209 & RSS-210 B.6.a (i , ii , iii , iv)
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.4°C Relative Humidity:53.4% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

Limit/Criterion:

Frequency Range (MHz)	E-field Strength Limit (Uv/m)	E-field Strength Limit @3m (dBuV/m)
0.009-0490	2400/F (kHz) @300m	129-94
0.490-1.705	24000/F (kHz) @30m	74-63
1.705-30	30 @30m	70

Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula:
 Extrapolation (Db) = 40log10(Measurement Distance / Specification Distance)
 dBuA/m=dBuV/m / 120π
 Based on RSS-Gen Table 5, the ISED limit is the same as above.

EUT Setup:



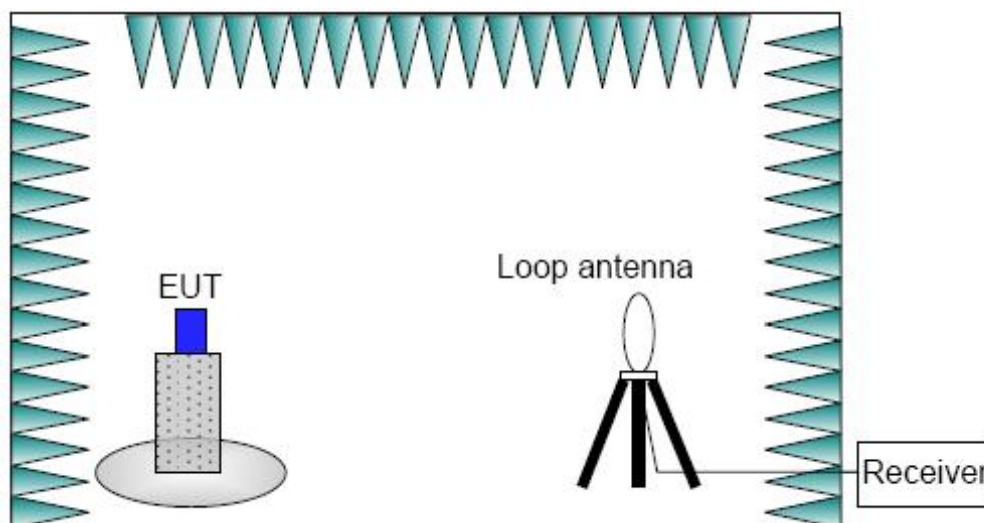
Mode 1

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EUT Connection Diagram of Test System



Test Method:

a. The electric field radiated emissions from the EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving antenna is 1 meter above the ground. The E-field is measured with a shielded loop antenna connected to a measurement receiver. Detected E-field was maximized by rotating the EUT through 360° and adjusting the receiving antenna polarizations. Both horizontal and vertical polarizations of the antenna were set during the measurement. The maximization processes were repeated with the EUT positioned respectively in its three orthogonal axes. The measurements were performed with the peak detector and if required, the quasi-peak detector.

b. The measurement bandwidth:

Frequency (MHz)	RBW / VBW
0.009-30	10 / 30kHz

Uncertainty Measurement:

The measurement uncertainty $U=4.30\text{dB}(k=2)$.

Test Condition:

Frequency Range (MHz)	RBW/VBW	Sweep Time (s)
0.009-30	10kHz/30kHz	AUTO

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Test Result:

Main Supply_S1:

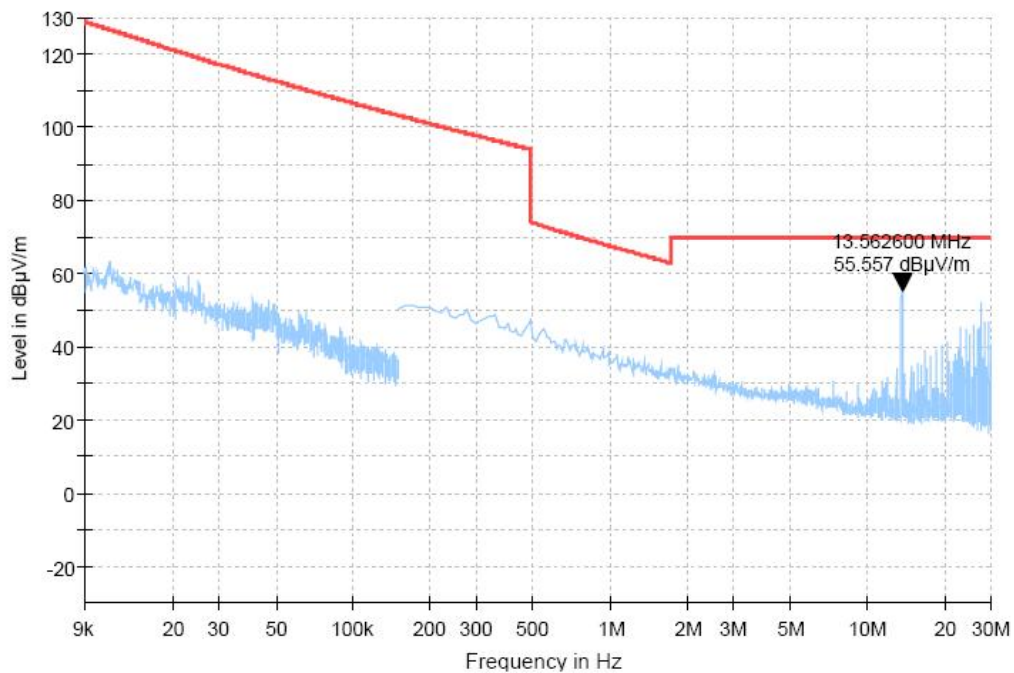


Figure 7.3.2-1 Mode 1 Electric Field Radiated Emissions (Below 30MHz)

Secondary Supply_S2:

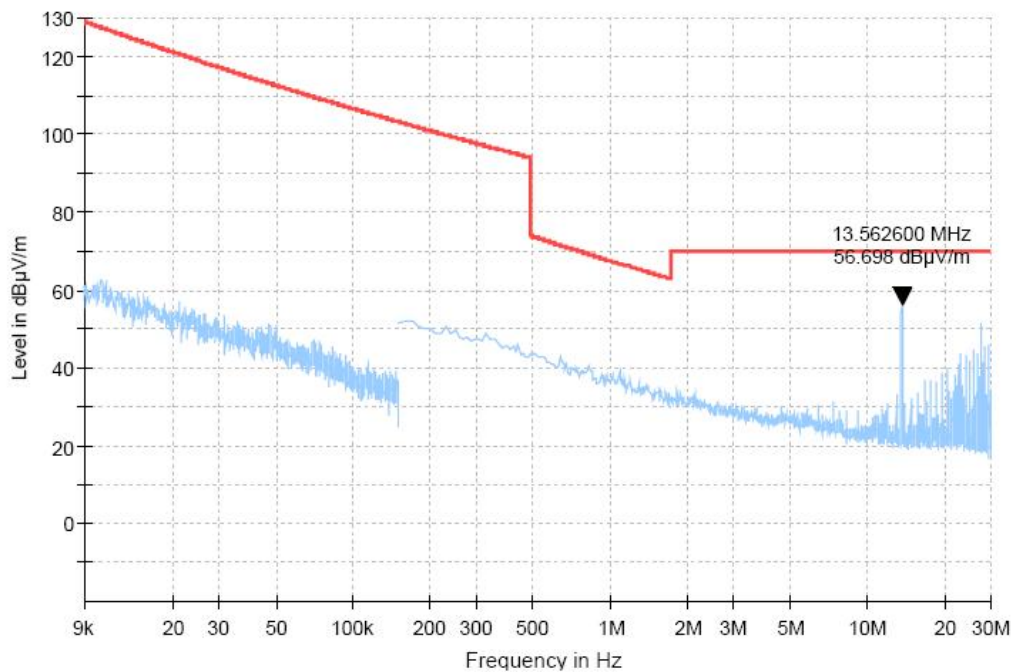


Figure 7.3.2-2 Mode 1 Electric Field Radiated Emissions (Below 30MHz)

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7.3.3 Electric Field Radiated Emissions (Above 30MHz)
S1 (Main supply)

Specifications:	15.225 (a) (b) (c) (d) and 15.209 & RSS-210 B.6.a (i , ii , iii , iv)
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.4°C Relative Humidity:53.4% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass
Note: The worst case of Electric Field Radiated Emissions (Above 30MHz) is Mode 1.	

S2 (Secondary supply)

Specifications:	15.225 (a) (b) (c) (d) and 15.209 & RSS-210 B.6.a (i , ii , iii , iv)
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.4°C Relative Humidity:53.4% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

Limit/Criterion:

Frequency Range (MHz)	Quasi-Peak (DbμV/m)	Peak (DbμV/m)	Average (DbμV/m)
30-88	40	N/A	N/A
88-216	43.5	N/A	N/A
216-960	46	N/A	N/A
Above 960	54	N/A	N/A
Above 1000	N/A	74	54

ISED Limit:

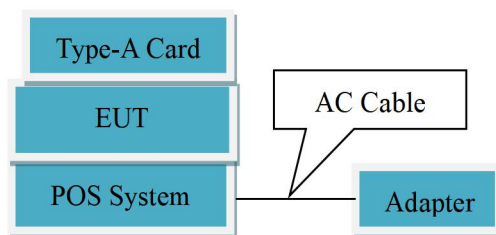
Frequency Range (MHz)	Field Strength (μV/m at 3 metres)	Field Strength (DbμV/m at 3 metres)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54
Note: dBuV/m = 20 log Uv/m		

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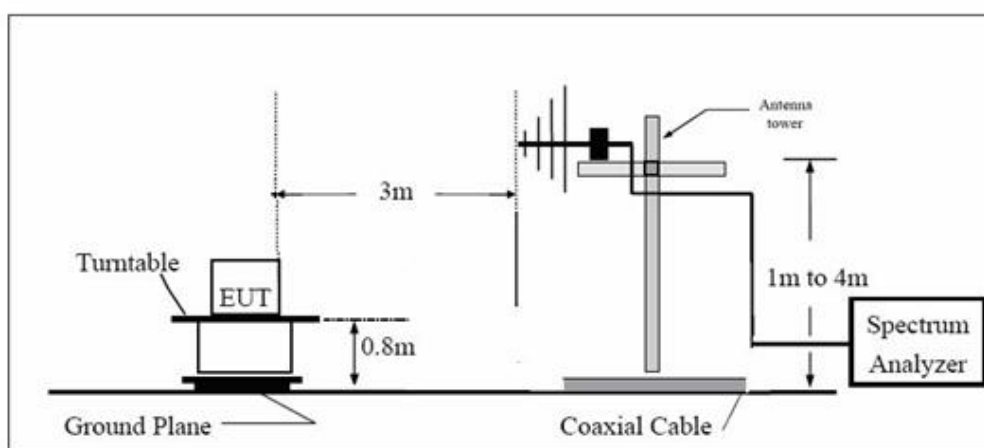
FAX:0086-23-88608777

EUT Setup:



Mode 1

EUT Connection Diagram of Test System



Test Method:

a. The electric field radiated emissions from the EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving antenna is 1 meter above the ground. The E-field is measured with a shielded loop antenna connected to a measurement receiver. Detected E-field was maximized by rotating the EUT through 360° and adjusting the receiving antenna polarizations. Both horizontal and vertical polarizations of the antenna were set during the measurement. The maximization processes were repeated with the EUT positioned respectively in its three orthogonal axes. The measurements were performed with the peak detector and if required, the quasi-peak detector.

b. The measurement bandwidth:

Frequency (MHz)	RBW / VBW
30-1000	120 kHz / 300kHz

Uncertainty Measurement:

The measurement uncertainty (30MHz-150MHz) is 3.79 dB (k=2).

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The measurement uncertainty (150MHz-1000MHz) is 3.51dB (k=2).

Test Condition:

Frequency Range (MHz)	RBW/VBW	Sweep Time (s)
30-1000	120 kHz / 300kHz	AUTO

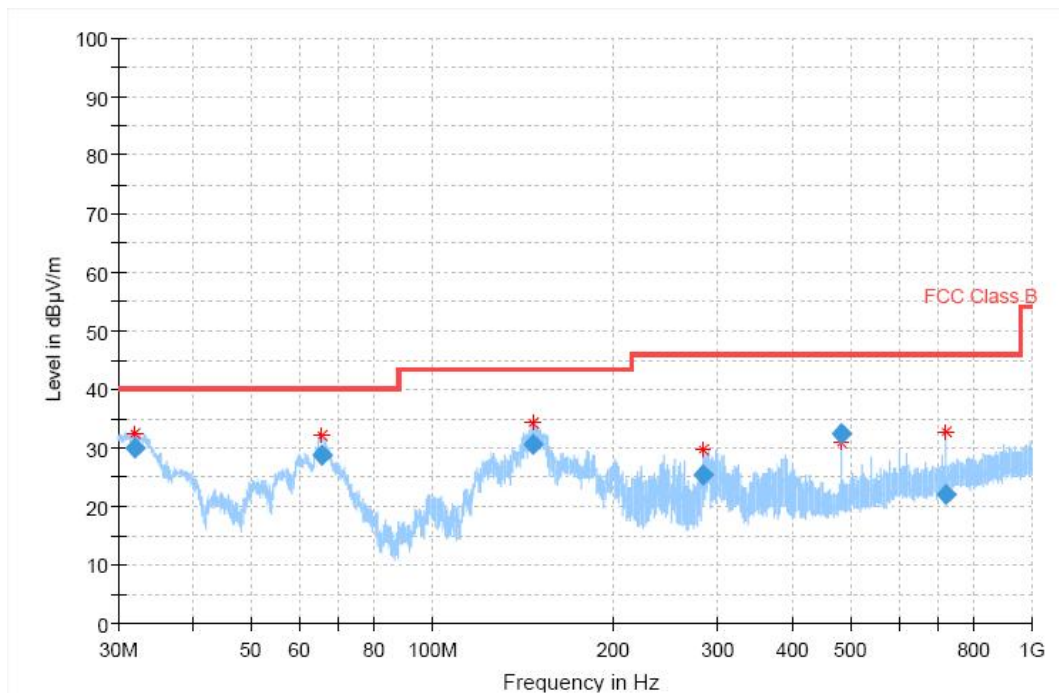
Test Result:
Main Supply_S1:


Figure 7.3.3-1 Mode 1 Electric Field Radiated Emissions (Above 30MHz)

Frequency (MHz)	QuasiPeak (DbμV/m)	Limit (DbμV/m)	Margin (Db)	Height (cm)	Pol	Azimuth (deg)	Corr. (Db)
32.013115	29.92	40.00	10.08	100.0	V	72.0	-16
65.466125	28.63	40.00	11.37	100.0	V	63.0	-14
147.853771	30.49	43.50	13.01	100.0	V	100.0	-17
283.665824	25.29	46.00	20.71	100.0	H	256.0	-11
479.998080	32.31	46.00	13.69	100.0	V	359.0	-6
719.945496	22.03	46.00	23.97	100.0	H	24.0	-2

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Secondary Supply_S2:

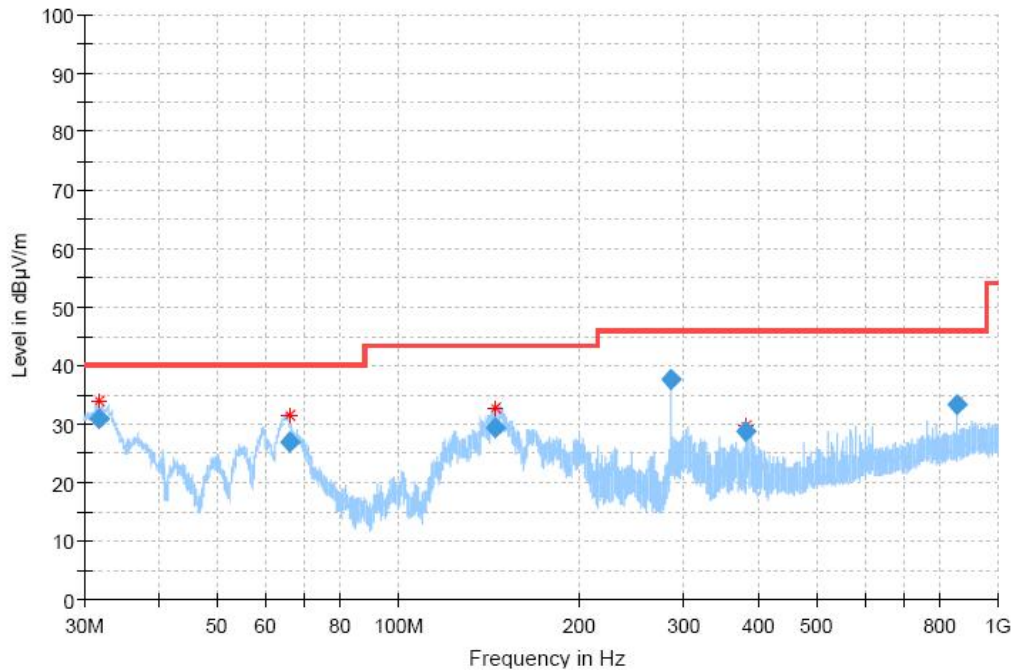


Figure 7.3.3-2 Mode 1 Electric Field Radiated Emissions (Above 30MHz)

Frequency (MHz)	QuasiPeak (DbμV/m)	Limit (DbμV/m)	Margin (Db)	Height (cm)	Pol	Azimuth (deg)	Corr. (Db)
31.719365	31.03	40.00	8.97	100.0	V	167.0	-16
65.823453	26.97	40.00	13.03	100.0	V	234.0	-14
145.095075	29.45	43.50	14.05	105.0	V	124.0	-17
284.737888	37.53	46.00	8.47	100.0	H	14.0	-11
379.704848	28.85	46.00	17.15	124.0	V	-14.0	-8
854.341667	33.24	46.00	12.76	100.0	V	28.0	0

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7.4. Conducted Emission

S1 (Main supply)

Specifications:	15.207 & RSS-Gen 8.8
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.0°C Relative Humidity:49.9% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

S2 (Secondary supply)

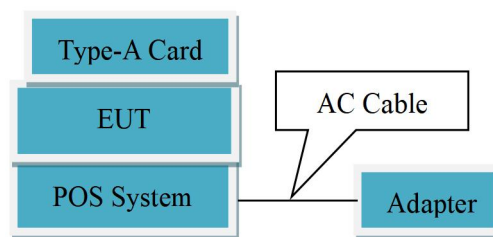
Specifications:	15.207 & RSS-Gen 8.8
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.0°C Relative Humidity:49.9% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

Limit Level Construction:

Frequency Range (MHz)	Conducted Limit (dBuV)	
	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
Based on RSS-Gen Table 3, the ISED limit is the same as above.

EUT Setup:

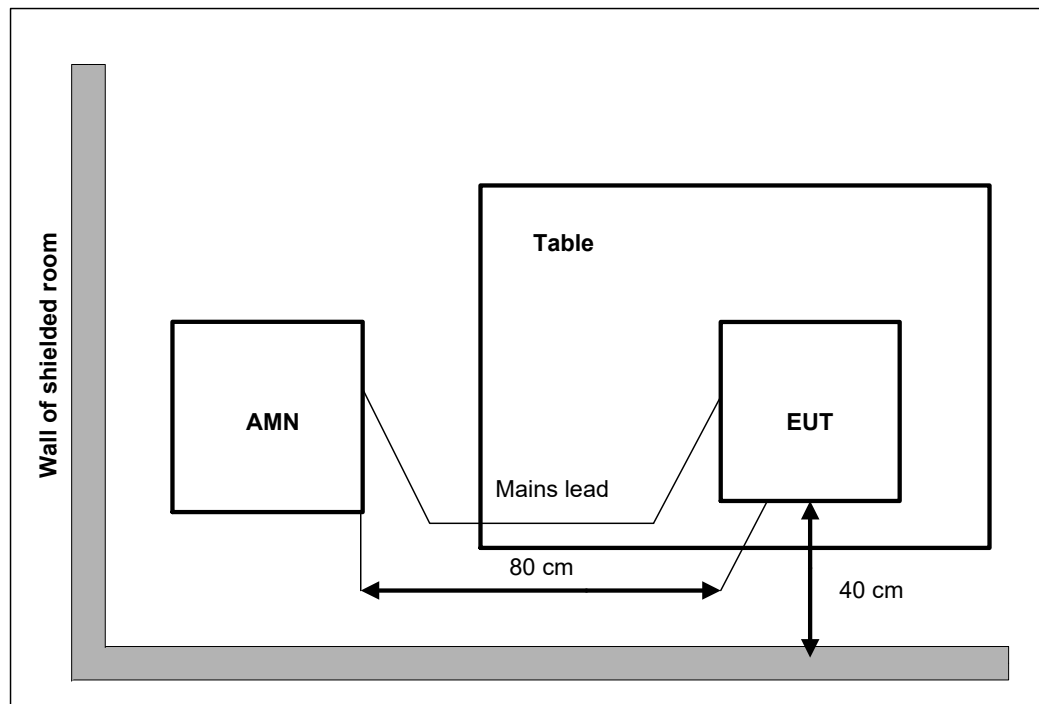


Mode 1

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Test Method:

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector. Tested in accordance with the procedures of ANSI C63.10-2013

Uncertainty Measurement:

The measurement uncertainty (150kHz-30MHz) is 1.97 dB (k=2).

Test Result:

Main Supply_S1:

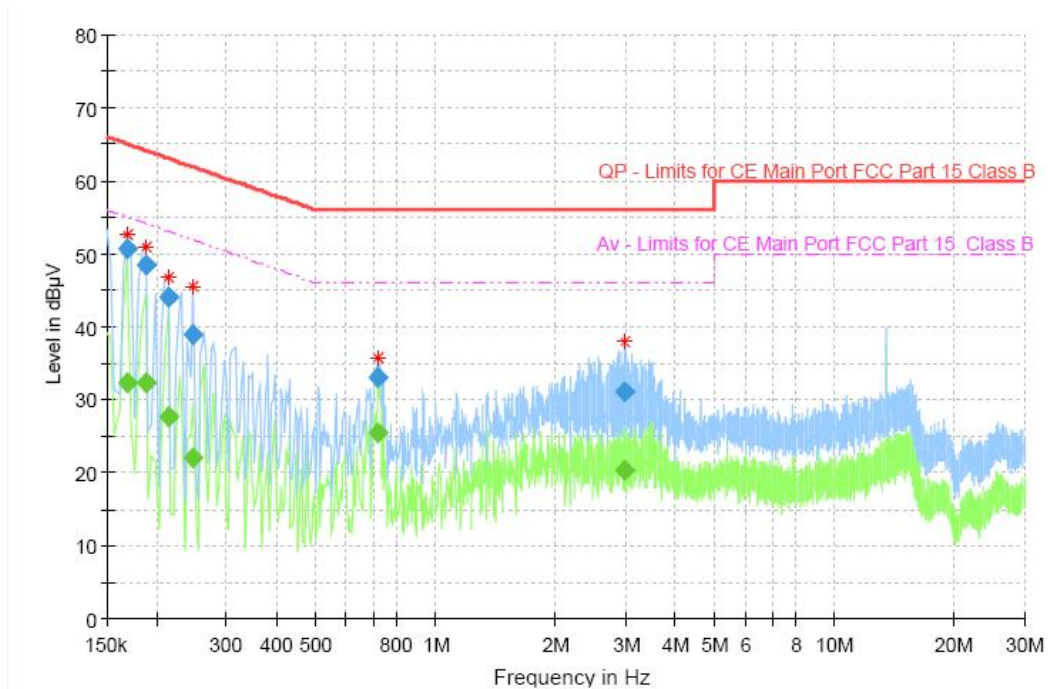


Figure 7.4.1 CE 150kHz-30MHz Mode 1_Main supply_S1

Final Result

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.168656	---	32.30	15000	9.000	L1	ON	9.6	22.73	55.03
0.168656	50.53	---	15000	9.000	L1	ON	9.6	14.50	65.03
0.187313	---	32.35	15000	9.000	L1	ON	9.6	21.80	54.16
0.187313	48.47	---	15000	9.000	L1	ON	9.6	15.68	64.16
0.213431	---	27.71	15000	9.000	L1	ON	9.6	25.37	53.07
0.213431	44.15	---	15000	9.000	L1	ON	9.6	18.92	63.07
0.247013	---	21.92	15000	9.000	L1	ON	9.6	29.94	51.86
0.247013	38.78	---	15000	9.000	L1	ON	9.6	23.08	61.86
0.720881	---	25.42	15000	9.000	N	ON	9.6	20.58	46.00
0.720881	33.15	---	15000	9.000	N	ON	9.6	22.85	56.00
2.993213	---	20.26	15000	9.000	N	ON	9.6	25.74	46.00
2.993213	31.13	---	15000	9.000	N	ON	9.6	24.87	56.00

L1 and N is all have been tested, the result of them is synthesized in the above data diagram.

Emission level(quasi-peak or Average peak)(dBμV)=Raw value by receiver(dBμV) + Corr(Insertion loss+ cable loss) (dB)

The raw value is used to calculate by software which is not shown in the sheet.

Margin (dB) =limit value(dBμV) – emission level(dBμV).

Secondary Supply_S2:

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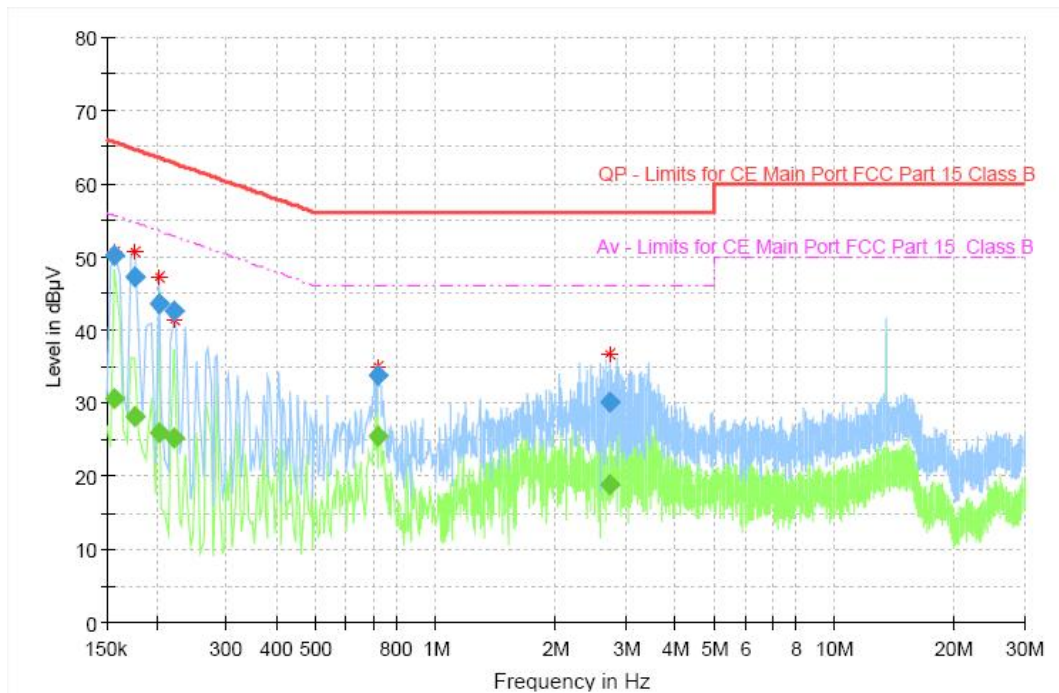


Figure 7.4.2 CE 150kHz-30MHz Mode 1_Secondary supply_S2

Final Result

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.157463	---	30.57	15000	9.000	L1	ON	9.6	25.03	55.60
0.157463	50.18	---	15000	9.000	L1	ON	9.6	15.42	65.60
0.176119	---	28.07	15000	9.000	L1	ON	9.6	26.60	54.67
0.176119	47.17	---	15000	9.000	L1	ON	9.6	17.50	64.67
0.202238	---	25.86	15000	9.000	L1	ON	9.6	27.65	53.52
0.202238	43.52	---	15000	9.000	L1	ON	9.6	20.00	63.52
0.220894	---	25.27	15000	9.000	L1	ON	9.6	27.52	52.79
0.220894	42.60	---	15000	9.000	L1	ON	9.6	20.19	62.79
0.717150	---	25.55	15000	9.000	N	ON	9.6	20.45	46.00
0.717150	33.81	---	15000	9.000	N	ON	9.6	22.19	56.00
2.728294	---	18.92	15000	9.000	N	ON	9.6	27.08	46.00
2.728294	30.13	---	15000	9.000	N	ON	9.6	25.87	56.00

L1 and N is all have been tested, the result of them is synthesized in the above data diagram.

Emission level(quasi-peak or Average peak)(dBμV)=Raw value by receiver(dBμV) + Corr(Insertion loss+ cable loss) (dB)

The raw value is used to calculate by software which is not shown in the sheet.

Margin (dB) =limit value(dBμV) – emission level(dBμV).

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7.5. Occupied bandwidth

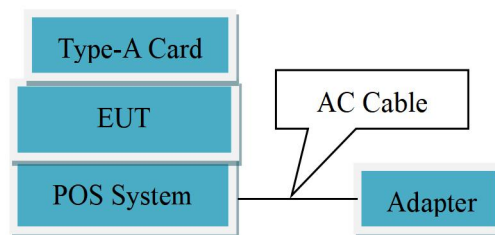
S1 (Main supply)

Specifications:	RSS-Gen 6.7
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.0°C Relative Humidity:49.9% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

S2 (Secondary supply)

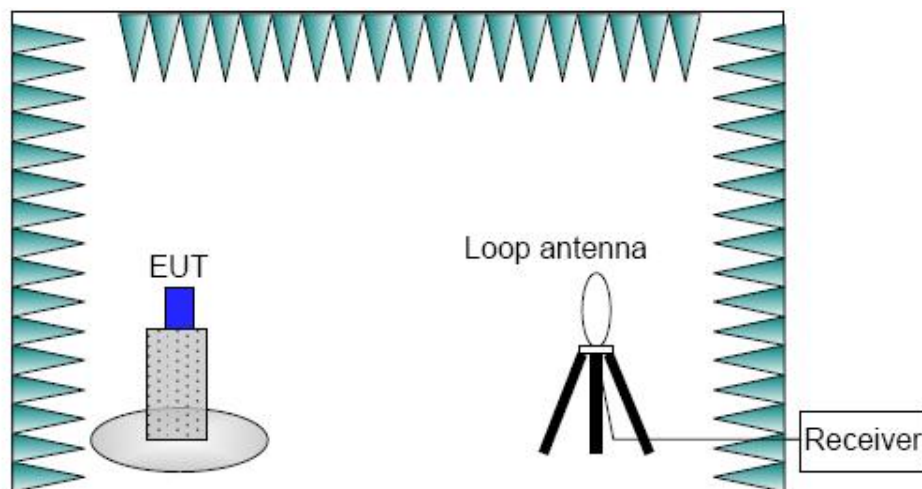
Specifications:	RSS-Gen 6.7
Date of Tests	2023-08-17
Test conditions:	Ambient Temperature:23.0°C Relative Humidity:49.9% Air pressure: 100.4kPa
Operation Mode	Mode 1: TX mode+ CB04+ UE01+ AE1+ AE2+ AE3
Test Results:	Pass

EUT Setup:



Mode 1

EUT Connection Diagram of Test System



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Test Method:

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

The following conditions shall be observed for measuring the occupied bandwidth:

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x Db bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x Db bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

Uncertainty Measurement:

The measurement uncertainty is 70.06Hz (k=2)

Test Result

Main Supply _S1:

Center Freq. (MHz)	Threshold Level	fL (MHz)	fH (MHz)
13.56051	99% OBW	13.56047	13.56054

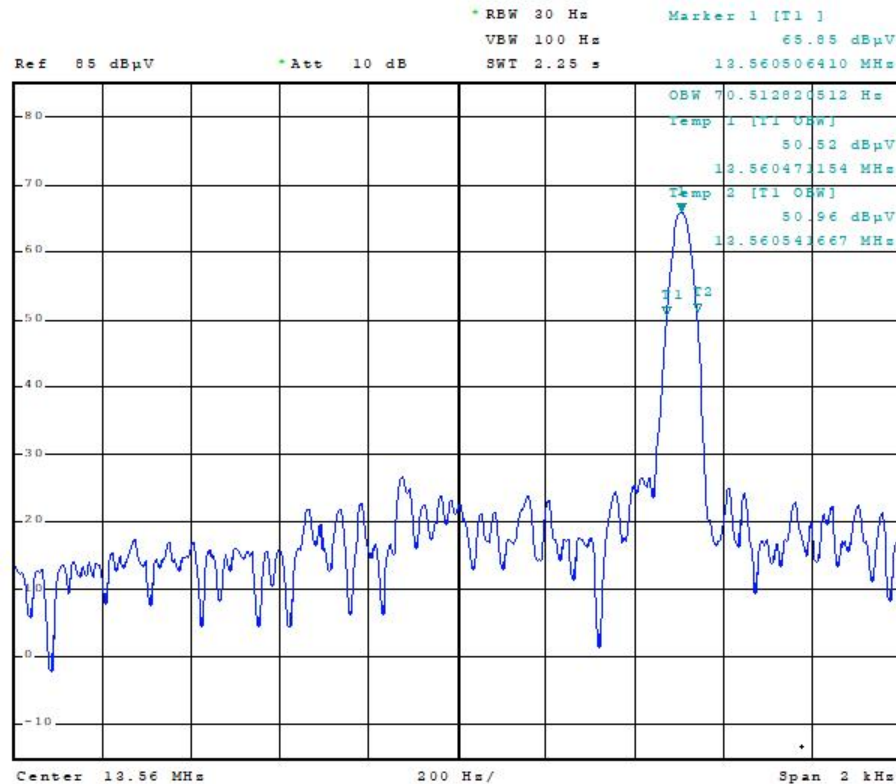


Figure 7.5.1 Mode 1 Occupied bandwidth

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Secondary Supply _S2

Center Freq. (MHz)	Threshold Level	fL(MHz)	fH(MHz)
13.56058	99% OBW	13.56053	13.56060

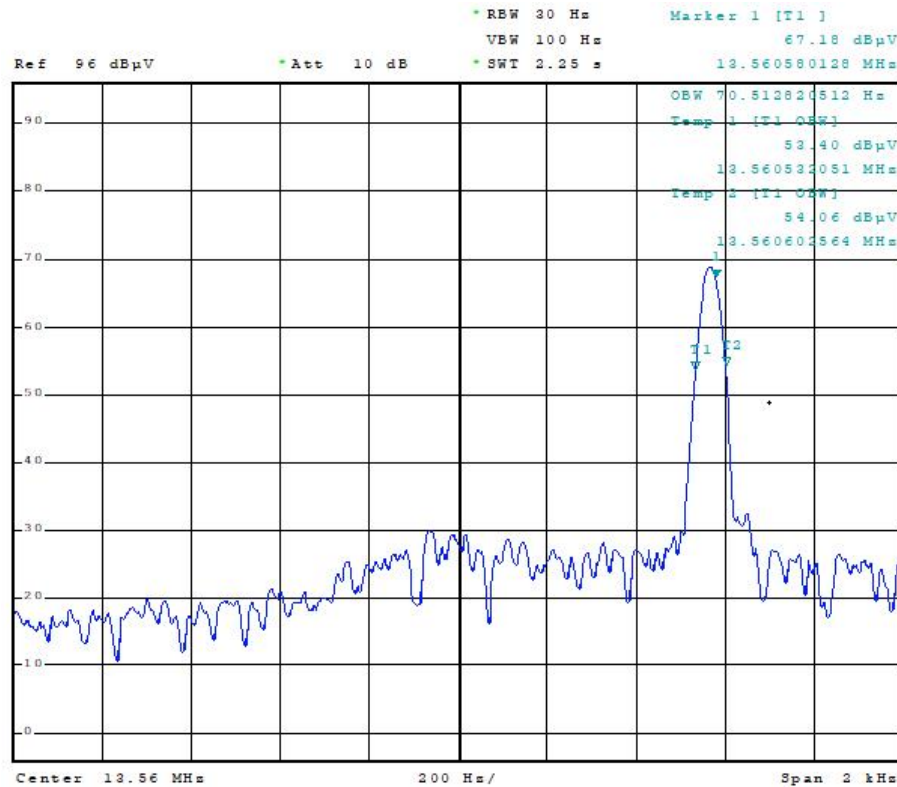


Figure 7.5.-2 Mode 1 Occupied bandwidth



Report No.: I23W00037-NFC

Annex A EUT Photos

See the document" I23W00037-External Photos".

See the document" I23W00037-Internal Photos".

Test photo See the in document" I23W00037_NFC Test Setup Photos".

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ANNEX B Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

*****END OF REPORT*****

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