

FCC Test Report (NFC)

Report No.: RF200507E01A

FCC ID: NKR-XRCI

Test Model: XRCI

Received Date: May 03, 2020

Test Date: May 04 to 18, 2020

Issued Date: June 09, 2020

Applicant: Wistron NeWeb Corp.

Address: 20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C.

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan

**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF200507E01A	Original release.	June 09, 2020

1 Certificate of Conformity

Product: XRCI NFC Module

Brand: WNC

Test Model: XRCI

Sample Status: ENGINEERING SAMPLE

Applicant: Wistron NeWeb Corp.

Test Date: May 04 to 18, 2020

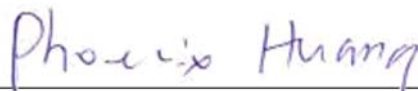
Standards: 47 CFR FCC Part 15, Subpart C (Section 15.225)

47 CFR FCC Part 15, Subpart C (Section 15.215)

ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :


Phoenix Huang / Specialist

Date:

June 09, 2020

Approved by :



Clark Lin / Technical Manager

Date:

June 09, 2020

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.225, 15.215)			
FCC Clause	Test Item	Result	Remarks
15.207	Conducted emission test	PASS	Meet the requirement of limit. Minimum passing margin is -10.96 dB at 0.43125 MHz.
15.225 (a)	The field strength of any emissions within the band 13.553-13.567 MHz	PASS	Meet the requirement of limit. Minimum passing margin is -44.69 dB at 13.56 MHz.
15.225 (b)	The field strength of any emissions within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	PASS	Meet the requirement of limit.
15.225 (c)	The field strength of any emissions within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	PASS	Meet the requirement of limit.
15.225 (d)	The field strength of any emissions appearing outside of the 13.110-14.010 MHz band	PASS	Meet the requirement of limit. Minimum passing margin is -1.8 dB at 257.64 MHz.
15.225 (e)	The frequency tolerance	PASS	Meet the requirement of limit.
15.215 (c)	20dB Bandwidth	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is 7 Pin FPC/FFC not a standard connector.

Note:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.8 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	XRCI NFC Module
Brand	WNC
Test Model	XRCI
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	ASK
Transfer Rate	Refer to Note
Operating Frequency	13.56MHz
Number of Channel	1
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. The antenna provided to the EUT, please refer to the following table:

Brand	Model No.	Frequency Range (MHz)	Antenna Type	Connector Type
WNC	48XRAKA1.SGA	13.56	loop antenna	7 Pin FPC/FFC

2. The EUT has three types according to NFC technology as following table:

Mode	Type	Modulation	Data rate
Active	A	100%, ASK	106 kbit/s
	B	10%, ASK	106 kbit/s
	F	8-30%, ASK	212 kbit/s, 424 kbit/s

3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

One channel was provided to this EUT:

Channel	Frequency (MHz)
1	13.56

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE	PLC	FS	EB	
-	√	√	√	√	-

Where

RE≥1G: Radiated Emission

PLC: Power Line Conducted Emission

FS: Frequency Stability

EB: 20dB Bandwidth measurement

Note: The EUT's Loop antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.

Radiated Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Type
1	1	ASK

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Type
1	1	ASK

Frequency Stability:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Type
1	1	ASK

20dB Bandwidth:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

Available Channel	Tested Channel	Modulation Type
1	1	ASK

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested By
RE	25deg. C, 75%RH	120Vac, 60Hz	Nelson Teng
PLC	24deg. C, 68%RH	120Vac, 60Hz	Sampson Chen
FS	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen
EB	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

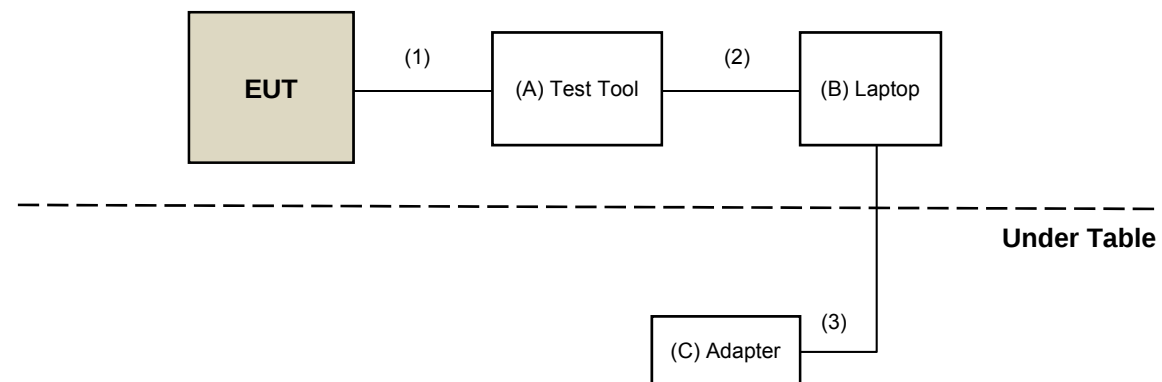
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Test Tool	NA	48XRAF18.SGC	NA	NA	Supplied by client
B.	Laptop	Lenovo	81A4	YD02YN76	PD93165NGU	Provided by Lab
C.	Adapter	Lenovo	PA-1450-55LL	NA	NA	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Console Cable	1	0.13	No	0	Supplied by client
2.	USB Cable	1	1	Yes	0	Supplied by client
3.	DC Cable	1	2	No	0	Provided by Lab

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.225)

FCC Part 15, Subpart C (15.215)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Emission Measurement

4.1.1 Limits of Radiated Emission Measurement

(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 as below table:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
4. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

For Radiated Emission test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 03, 2019	July 02, 2020
Pre-Amplifier EMC	EMC001340	980142	May 30, 2019	May 29, 2020
Loop Antenna Electro-Metrics	EM-6879	264	Feb. 18, 2020	Feb. 17, 2021
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 28, 2020	Apr. 27, 2021
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-3-1	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-2	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-3	Mar. 17, 2020	Mar. 16, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 26, 2019	Sep. 25, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: May 04 to 18, 2020

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	June 04, 2019	June 03, 2020
DC Power Supply Topward	6603D	795558	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 16, 2020	Jan. 15, 2021
True RMS Clamp Meter FLUKE	325	31130711WS	May 21, 2019	May 20, 2020
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

NOTE:

1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: May 15, 2020

4.1.3 Test Procedures

For Radiated Emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak or Peak / Average Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth of test receiver/spectrum analyzer is 200Hz at frequency below 150kHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 9kHz at frequency 150kHz~30MHz.

For Radiated Emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

Note:

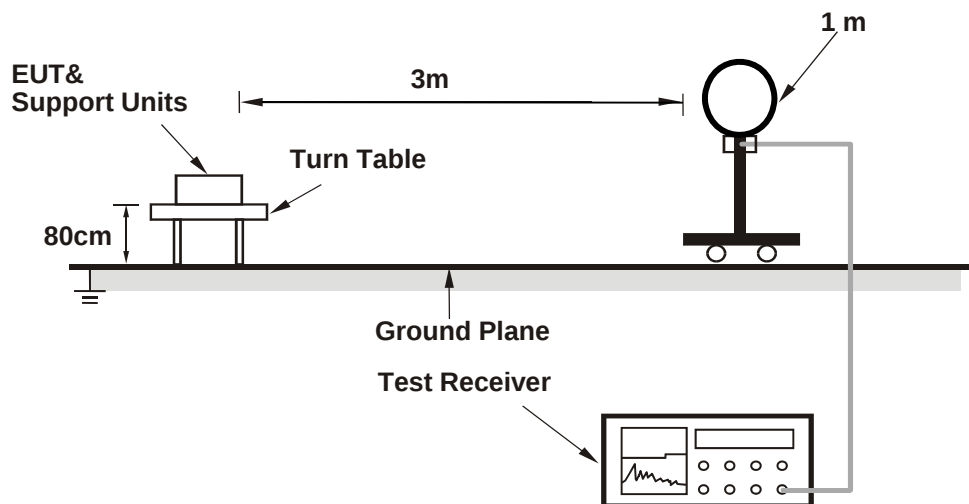
1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

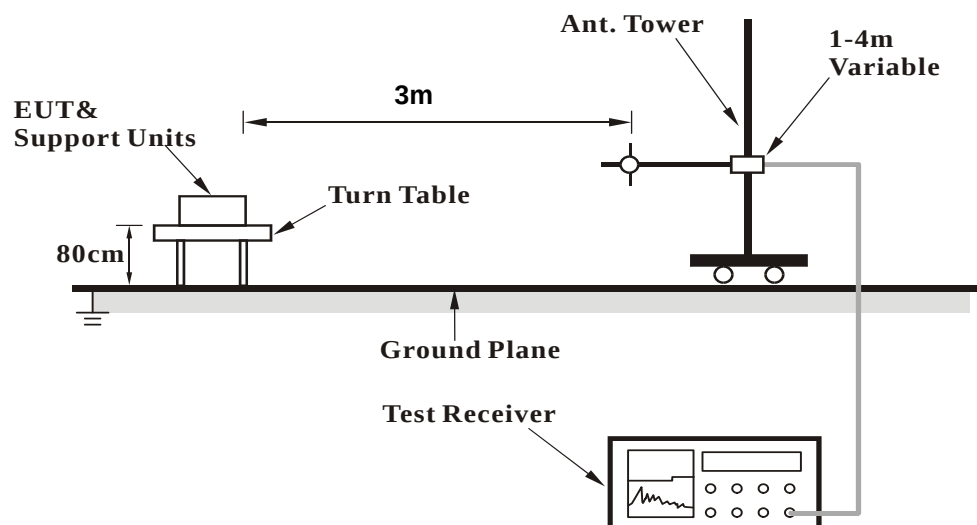
No deviation.

4.1.5 Test Setup

For Radiated Emission below 30MHz



For Radiated Emission 30MHz to 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Type A

Frequency Range	13.11MHz ~ 14.01MHz	Detector Function & Bandwidth	Quasi-Peak (QP), 9kHz
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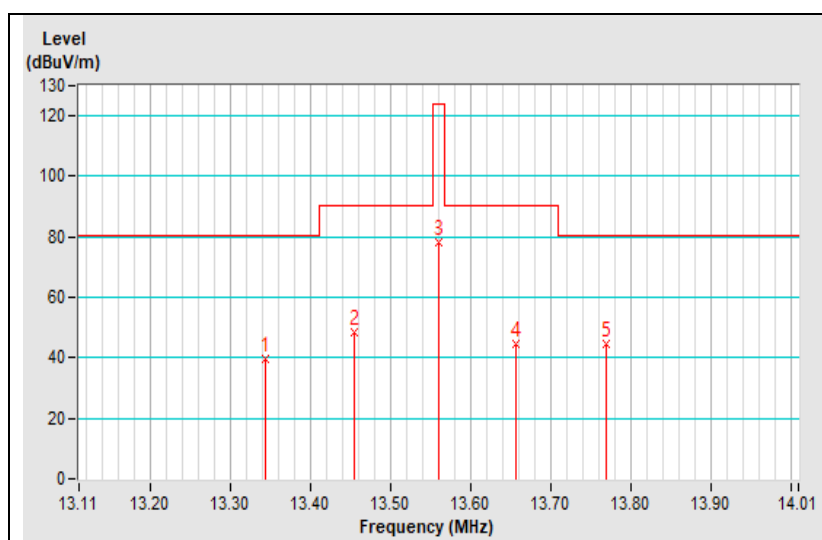
Antenna Polarity & Test Distance : Parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.343	39.88 QP	80.50	-40.62	1.00	54	43.54	-3.66
2	13.454	48.44 QP	90.47	-42.03	1.00	54	52.12	-3.68
3	*13.560	78.15 QP	124.00	-45.85	1.00	54	81.85	-3.70
4	13.656	44.38 QP	90.47	-46.09	1.00	54	48.10	-3.72
5	13.770	44.45 QP	80.50	-36.05	1.00	54	48.18	-3.73

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Above limits have been translated by the formula
 6. " * ": Fundamental frequency.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\mu\text{V/m} & 30\text{m} \\
 &= 84\text{dBuV/m} & 30\text{m} \\
 &= 84+20\log(30/3)^2 & 3\text{m} \\
 &= 124\text{dBuV/m}
 \end{aligned}$$



Frequency Range	13.11MHz ~ 14.01MHz	Detector Function & Bandwidth	Quasi-Peak (QP), 9kHz
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Antenna Polarity & Test Distance : Perpendicular at 3 m

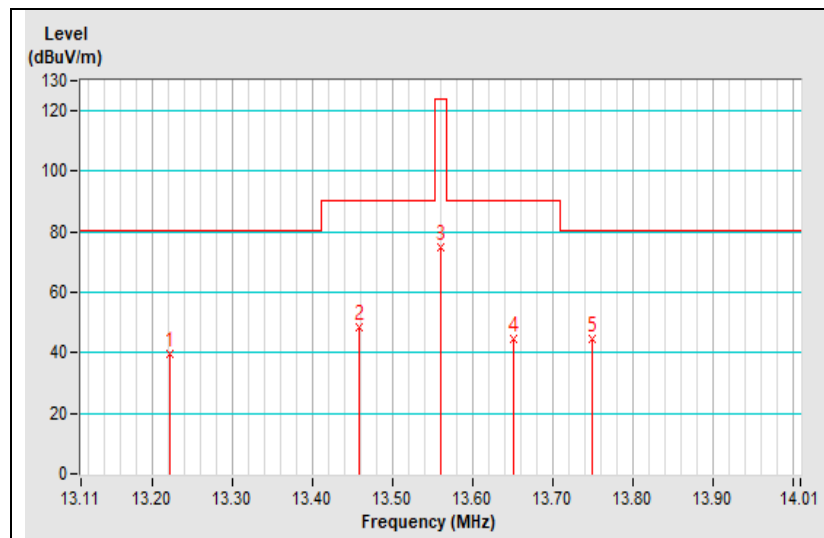
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.222	39.88 QP	80.50	-40.62	1.00	100	43.53	-3.65
2	13.458	48.44 QP	90.47	-42.03	1.00	100	52.12	-3.68
3	*13.560	74.88 QP	124.00	-49.12	1.00	100	78.58	-3.70
4	13.652	44.39 QP	90.47	-46.08	1.00	100	48.11	-3.72
5	13.750	44.39 QP	80.50	-36.11	1.00	100	48.12	-3.73

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Above limits have been translated by the formula
 6. " * ": Fundamental frequency.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\mu\text{V/m} & 30\text{m} \\
 &= 84\text{dBuV/m} & 30\text{m} \\
 &= 84+20\log(30/3)^2 & 3\text{m} \\
 &= 124\text{dBuV/m}
 \end{aligned}$$



Frequency Range	13.11MHz ~ 14.01MHz	Detector Function & Bandwidth	Quasi-Peak (QP), 9kHz
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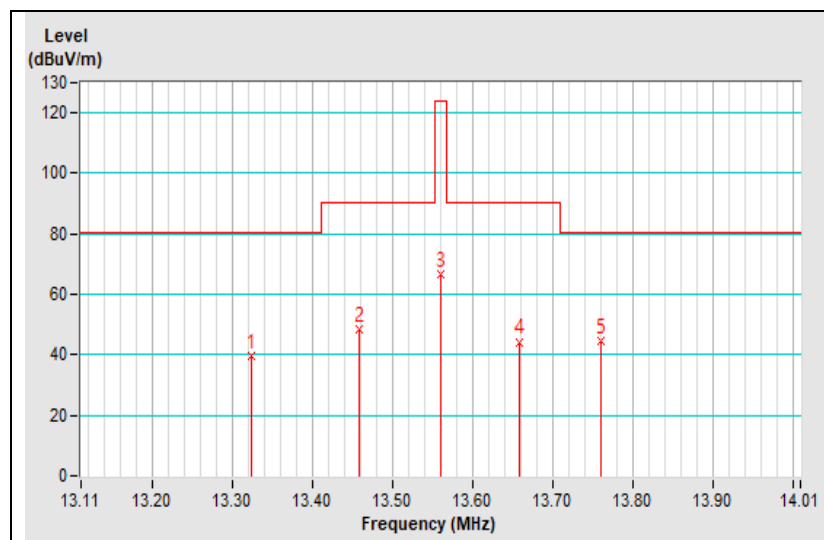
Antenna Polarity & Test Distance : Ground-parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.323	39.88 QP	80.50	-40.62	1.00	95	43.53	-3.65
2	13.458	48.44 QP	90.47	-42.03	1.00	95	52.12	-3.68
3	*13.560	66.81 QP	124.00	-57.19	1.00	95	70.51	-3.70
4	13.659	44.33 QP	90.47	-46.14	1.00	95	48.05	-3.72
5	13.760	44.40 QP	80.50	-36.10	1.00	95	48.13	-3.73

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Above limits have been translated by the formula
 6. " * ": Fundamental frequency.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\mu\text{V/m} && 30\text{m} \\
 &= 84\text{dBuV/m} && 30\text{m} \\
 &= 84+20\log(30/3)^2 && 3\text{m} \\
 &= 124\text{dBuV/m}
 \end{aligned}$$

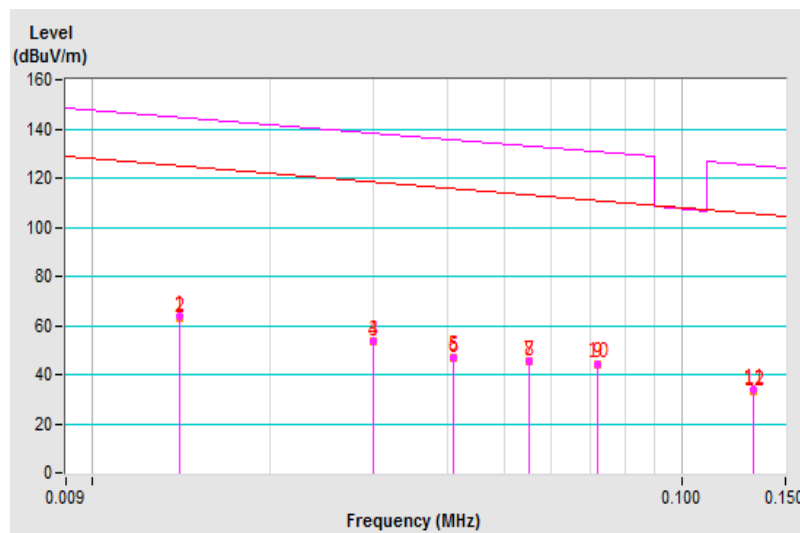


Frequency Range	9kHz ~ 150kHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 200Hz
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Antenna Polarity & Test Distance : Parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.014	63.43 PK	144.66	-81.23	1.00	126	28.98	34.45
2	0.014	63.08 AV	124.66	-61.58	1.00	126	28.63	34.45
3	0.030	53.41 PK	138.04	-84.63	1.00	216	26.10	27.31
4	0.030	53.37 AV	118.05	-64.68	1.00	216	26.06	27.31
5	0.041	46.88 PK	135.33	-88.45	1.00	38	22.00	24.88
6	0.041	46.65 AV	115.34	-68.69	1.00	38	21.77	24.88
7	0.055	45.49 PK	132.78	-87.29	1.00	206	23.24	22.25
8	0.055	45.18 AV	112.79	-67.61	1.00	206	22.93	22.25
9	0.072	44.40 PK	130.44	-86.04	1.00	179	24.50	19.90
10	0.072	44.34 AV	110.45	-66.11	1.00	179	24.44	19.90
11	0.132	33.84 PK	125.19	-91.35	1.00	350	19.09	14.75
12	0.132	33.21 AV	105.19	-71.98	1.00	350	18.46	14.75

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

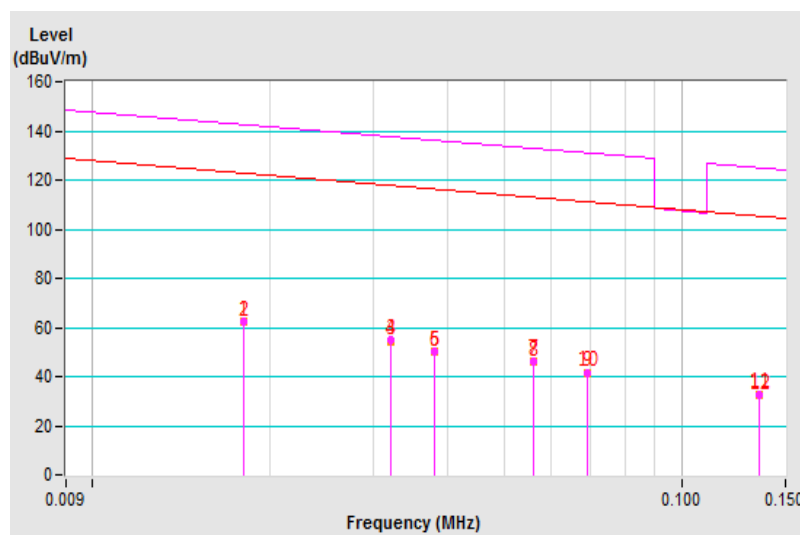


Frequency Range	9kHz ~ 150kHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 200Hz
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Antenna Polarity & Test Distance : Perpendicular at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.018	62.32 PK	142.48	-80.16	1.00	147	29.78	32.54
2	0.018	62.18 AV	122.48	-60.30	1.00	147	29.64	32.54
3	0.032	54.64 PK	137.48	-82.84	1.00	108	27.77	26.87
4	0.032	54.37 AV	117.49	-63.12	1.00	108	27.50	26.87
5	0.038	50.04 PK	135.99	-85.95	1.00	107	24.50	25.54
6	0.038	49.95 AV	116.00	-66.05	1.00	107	24.41	25.54
7	0.056	46.42 PK	132.62	-86.20	1.00	356	24.31	22.11
8	0.056	46.18 AV	112.63	-66.45	1.00	356	24.07	22.11
9	0.069	41.67 PK	130.81	-89.14	1.00	22	21.36	20.31
10	0.069	41.50 AV	110.82	-69.32	1.00	22	21.19	20.31
11	0.135	32.63 PK	124.99	-92.36	1.00	226	18.00	14.63
12	0.135	32.42 AV	104.99	-72.57	1.00	226	17.79	14.63

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

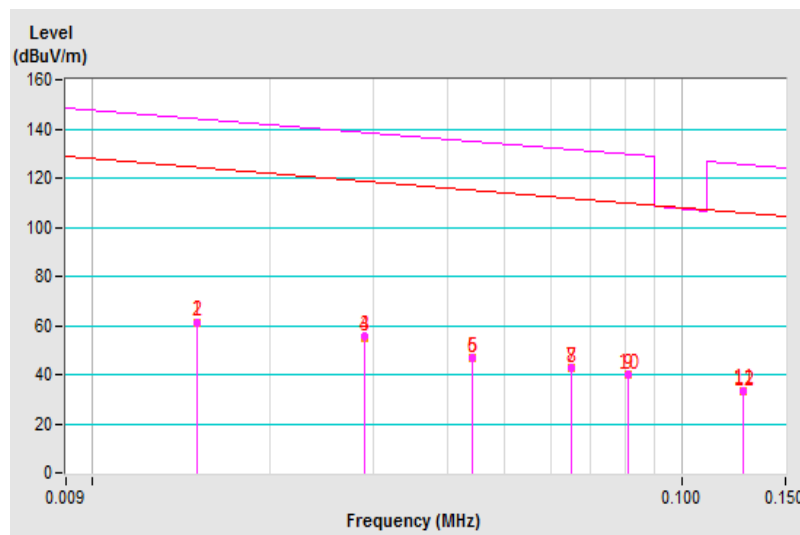


Frequency Range	9kHz ~ 150kHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 200Hz
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Antenna Polarity & Test Distance : Ground-parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.015	61.32 PK	144.06	-82.74	1.00	152	27.34	33.98
2	0.015	61.15 AV	124.07	-62.92	1.00	152	27.17	33.98
3	0.029	55.46 PK	138.34	-82.88	1.00	334	27.72	27.74
4	0.029	55.25 AV	118.34	-63.09	1.00	334	27.51	27.74
5	0.044	46.75 PK	134.72	-87.97	1.00	116	22.51	24.24
6	0.044	46.53 AV	114.73	-68.20	1.00	116	22.29	24.24
7	0.065	42.70 PK	131.33	-88.63	1.00	79	21.84	20.86
8	0.065	42.58 AV	111.34	-68.76	1.00	79	21.72	20.86
9	0.081	39.99 PK	129.42	-89.43	1.00	122	21.33	18.66
10	0.081	39.81 AV	109.43	-69.62	1.00	122	21.15	18.66
11	0.127	33.45 PK	125.52	-92.07	1.00	333	18.49	14.96
12	0.127	33.26 AV	105.52	-72.26	1.00	333	18.30	14.96

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

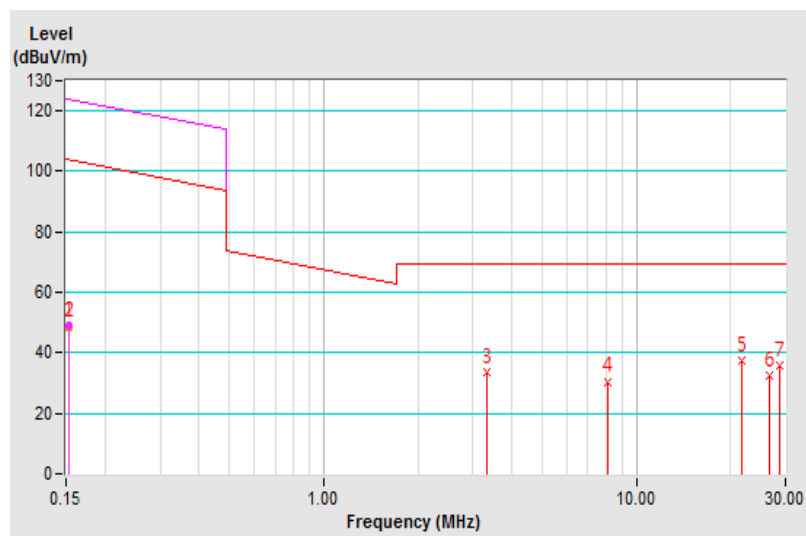


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Peak (PK) / Quasi-Peak (QP) / Average (AV), 9kHz
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Antenna Polarity & Test Distance : Parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.154	48.91 PK	123.85	-74.94	1.00	170	35.06	13.85
2	0.154	48.71 AV	103.85	-55.14	1.00	170	34.86	13.85
3	3.345	33.62 QP	69.50	-35.88	1.00	191	37.47	-3.85
4	8.124	30.54 QP	69.50	-38.96	1.00	231	33.96	-3.42
5	21.672	37.27 QP	69.50	-32.23	1.00	307	41.72	-4.45
6	26.615	32.34 QP	69.50	-37.16	1.00	320	35.95	-3.61
7	28.690	35.92 QP	69.50	-33.58	1.00	45	39.19	-3.27

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

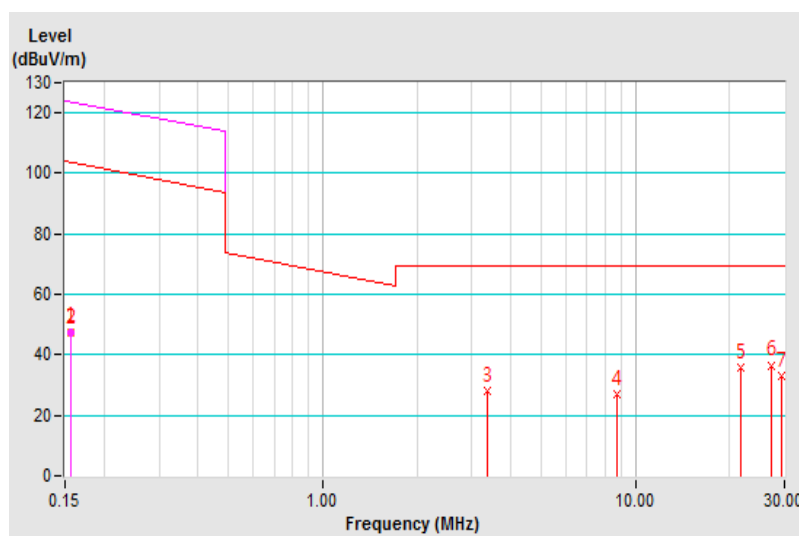


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Peak (PK) / Quasi-Peak (QP) / Average (AV), 9kHz
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Antenna Polarity & Test Distance : Perpendicular at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.156	47.62 PK	123.74	-76.12	1.00	50	33.86	13.76
2	0.156	47.23 AV	103.74	-56.51	1.00	50	33.47	13.76
3	3.357	27.99 QP	69.50	-41.51	1.00	290	31.84	-3.85
4	8.749	27.11 QP	69.50	-42.39	1.00	189	30.43	-3.32
5	21.670	35.95 QP	69.50	-33.55	1.00	177	40.40	-4.45
6	27.124	36.62 QP	69.50	-32.88	1.00	36	40.14	-3.52
7	29.242	32.80 QP	69.50	-36.70	1.00	122	35.98	-3.18

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

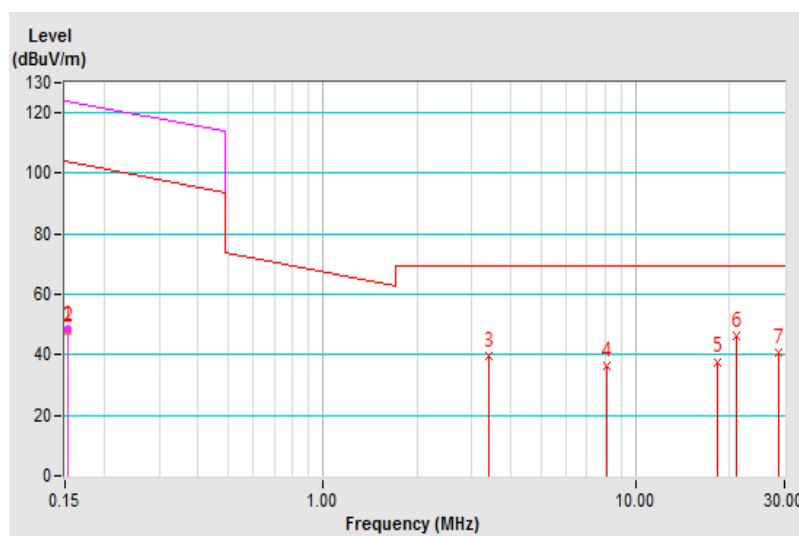


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Peak (PK) / Quasi-Peak (QP) / Average (AV), 9kHz
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Antenna Polarity & Test Distance : Ground-parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.154	48.25 PK	123.85	-75.60	1.00	162	34.40	13.85
2	0.154	48.09 AV	103.85	-55.76	1.00	162	34.24	13.85
3	3.409	39.83 QP	69.50	-29.67	1.00	239	43.67	-3.84
4	8.144	36.10 QP	69.50	-33.40	1.00	0	39.51	-3.41
5	18.247	37.70 QP	69.50	-31.80	1.00	240	42.15	-4.45
6	21.116	46.30 QP	69.50	-23.20	1.00	31	50.85	-4.55
7	28.691	40.54 QP	69.50	-28.96	1.00	176	43.81	-3.27

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

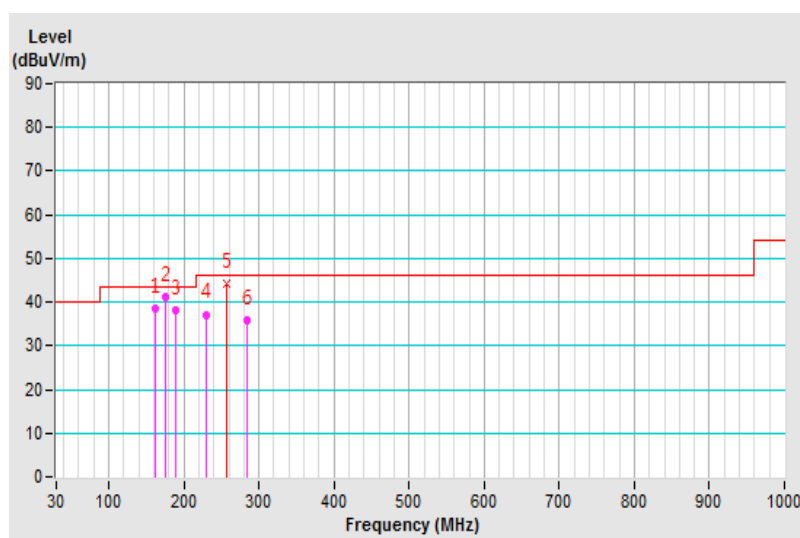


Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
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Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	162.720	38.60 QP	43.50	-4.90	2.00	238	45.50	-6.90
2	176.300	41.30 QP	43.50	-2.20	1.50	235	49.20	-7.90
3	189.880	38.10 QP	43.50	-5.40	1.50	235	47.60	-9.50
4	230.520	37.20 QP	46.00	-8.80	1.50	92	46.20	-9.00
5	257.640	44.20 QP	46.00	-1.80	1.00	259	52.00	-7.80
6	284.770	35.80 QP	46.00	-10.20	1.00	118	42.20	-6.40

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

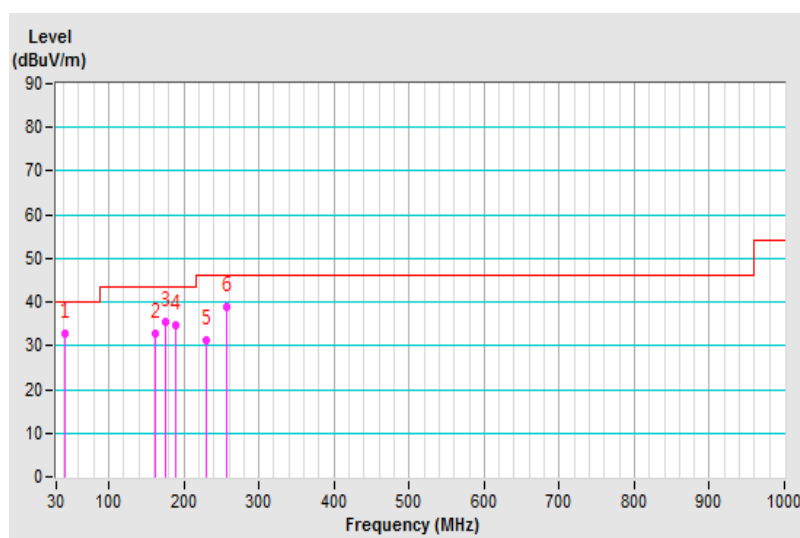


Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
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Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	40.690	32.90 QP	40.00	-7.10	1.00	360	40.90	-8.00
2	162.720	32.70 QP	43.50	-10.80	2.00	332	39.60	-6.90
3	176.280	35.30 QP	43.50	-8.20	1.50	0	43.20	-7.90
4	189.830	34.60 QP	43.50	-8.90	1.00	54	44.10	-9.50
5	230.550	31.20 QP	46.00	-14.80	1.00	281	40.20	-9.00
6	257.630	38.80 QP	46.00	-7.20	1.50	164	46.60	-7.80

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.



Type B

Frequency Range	13.11MHz ~ 14.01MHz	Detector Function & Bandwidth	Quasi-Peak (QP), 9kHz
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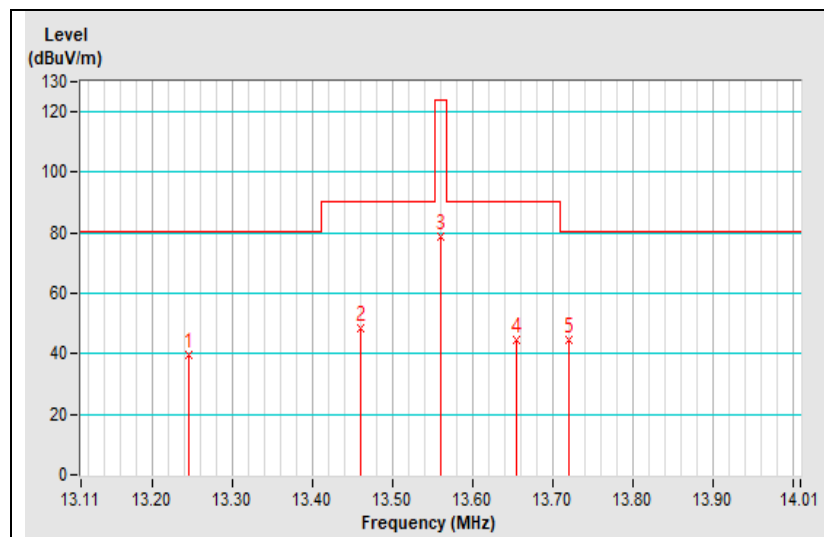
Antenna Polarity & Test Distance : Parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.244	39.82 QP	80.50	-40.68	1.00	117	43.47	-3.65
2	13.459	48.36 QP	90.47	-42.11	1.00	117	52.04	-3.68
3	*13.560	78.53 QP	124.00	-45.47	1.00	117	82.23	-3.70
4	13.655	44.39 QP	90.47	-46.08	1.00	117	48.11	-3.72
5	13.720	44.41 QP	80.50	-36.09	1.00	117	48.14	-3.73

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Above limits have been translated by the formula
 6. " * ": Fundamental frequency.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\text{uV/m} && 30\text{m} \\
 &= 84\text{dBuV/m} && 30\text{m} \\
 &= 84+20\log(30/3)^2 && 3\text{m} \\
 &= 124\text{dBuV/m}
 \end{aligned}$$



Frequency Range	13.11MHz ~ 14.01MHz	Detector Function & Bandwidth	Quasi-Peak (QP), 9kHz
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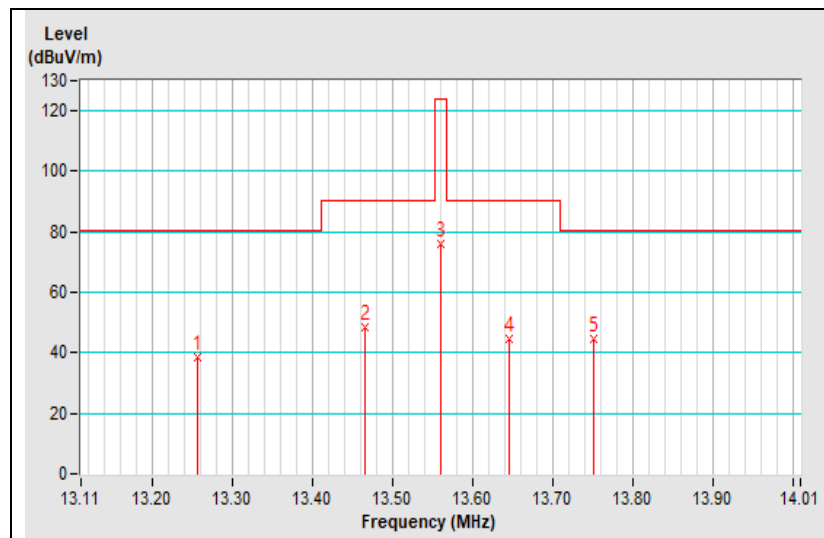
Antenna Polarity & Test Distance : Perpendicular at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.255	38.75 QP	80.50	-41.75	1.00	147	42.39	-3.64
2	13.465	48.49 QP	90.47	-41.98	1.00	147	52.17	-3.68
3	*13.560	75.86 QP	124.00	-48.14	1.00	147	79.56	-3.70
4	13.645	44.35 QP	90.47	-46.12	1.00	147	48.07	-3.72
5	13.752	44.42 QP	80.50	-36.08	1.00	147	48.15	-3.73

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Above limits have been translated by the formula
 6. " * ": Fundamental frequency.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\mu\text{V/m} && 30\text{m} \\
 &= 84\text{dBuV/m} && 30\text{m} \\
 &= 84+20\log(30/3)^2 && 3\text{m} \\
 &= 124\text{dBuV/m}
 \end{aligned}$$



Frequency Range	13.11MHz ~ 14.01MHz	Detector Function & Bandwidth	Quasi-Peak (QP), 9kHz
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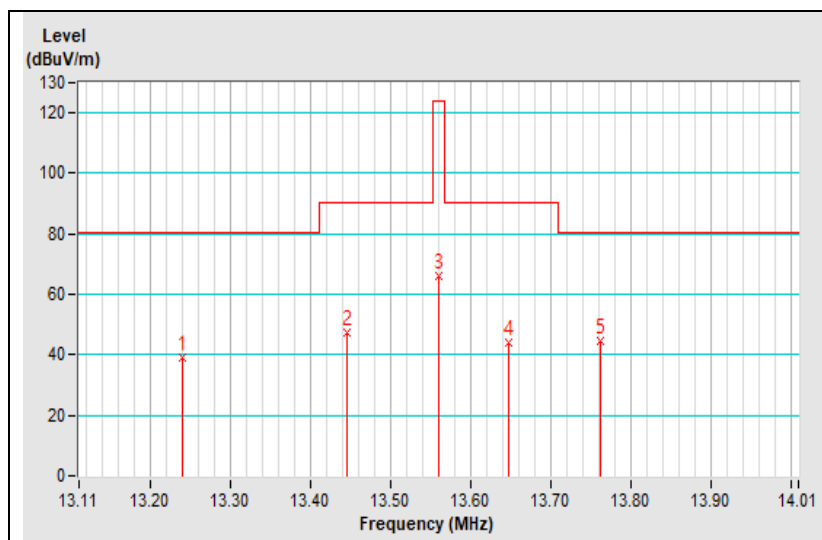
Antenna Polarity & Test Distance : Ground-parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.240	38.88 QP	80.50	-41.62	1.00	159	42.53	-3.65
2	13.446	47.56 QP	90.47	-42.91	1.00	159	51.24	-3.68
3	*13.560	66.23 QP	124.00	-57.77	1.00	159	69.93	-3.70
4	13.648	44.23 QP	90.47	-46.24	1.00	159	47.95	-3.72
5	13.762	44.42 QP	80.50	-36.08	1.00	159	48.15	-3.73

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Above limits have been translated by the formula
 6. " * ": Fundamental frequency.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\text{uV/m} && 30\text{m} \\
 &= 84\text{dBuV/m} && 30\text{m} \\
 &= 84+20\log(30/3)^2 && 3\text{m} \\
 &= 124\text{dBuV/m}
 \end{aligned}$$

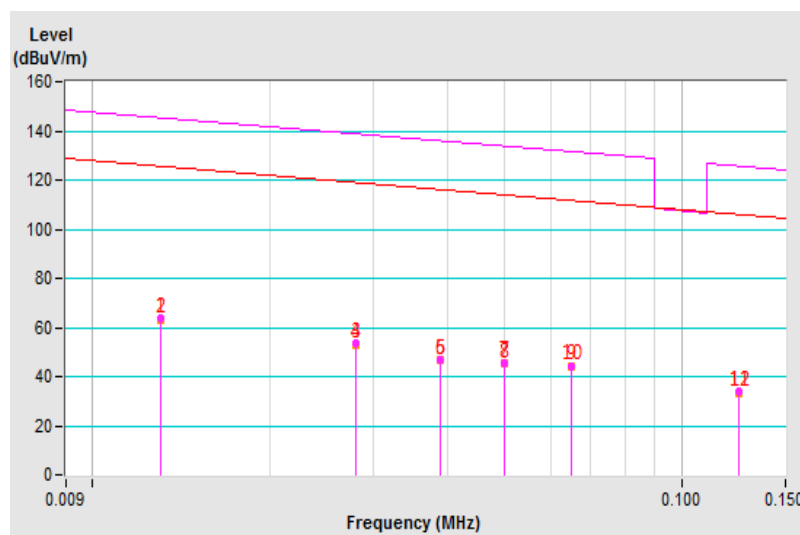


Frequency Range	9kHz ~ 150kHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 200Hz
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Antenna Polarity & Test Distance : Parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.013	63.52 PK	145.31	-81.79	1.00	142	28.59	34.93
2	0.013	63.33 AV	125.31	-61.98	1.00	142	28.40	34.93
3	0.028	53.37 PK	138.64	-85.27	1.00	199	25.20	28.17
4	0.028	53.22 AV	118.65	-65.43	1.00	199	25.05	28.17
5	0.039	46.82 PK	135.76	-88.94	1.00	22	21.50	25.32
6	0.039	46.64 AV	115.77	-69.13	1.00	22	21.32	25.32
7	0.050	45.54 PK	133.61	-88.07	1.00	222	22.60	22.94
8	0.050	45.43 AV	113.62	-68.19	1.00	222	22.49	22.94
9	0.065	44.31 PK	131.33	-87.02	1.00	162	23.45	20.86
10	0.065	44.16 AV	111.34	-67.18	1.00	162	23.30	20.86
11	0.125	33.69 PK	125.66	-91.97	1.00	360	18.65	15.04
12	0.125	33.43 AV	105.66	-72.23	1.00	360	18.39	15.04

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

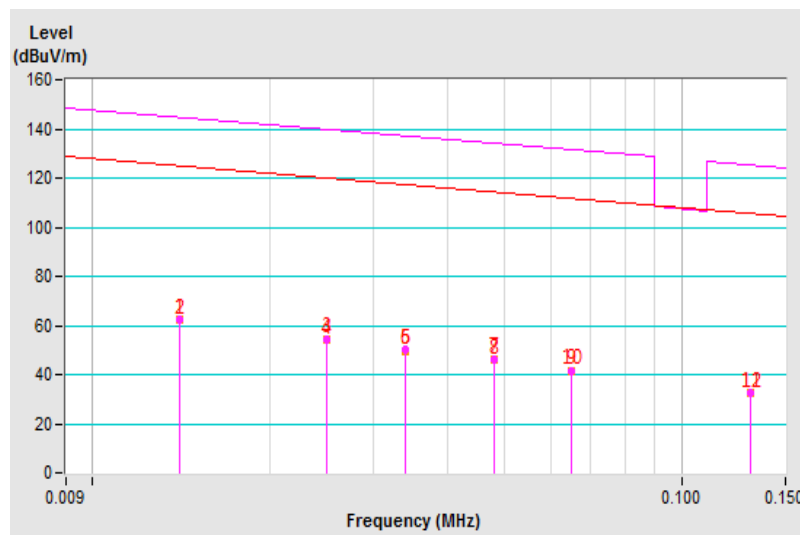


Frequency Range	9kHz ~ 150kHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 200Hz
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Antenna Polarity & Test Distance : Perpendicular at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.014	62.23 PK	144.66	-82.43	1.00	131	27.78	34.45
2	0.014	62.09 AV	124.66	-62.57	1.00	131	27.64	34.45
3	0.025	54.45 PK	139.63	-85.18	1.00	88	25.00	29.45
4	0.025	54.23 AV	119.63	-65.40	1.00	88	24.78	29.45
5	0.034	49.99 PK	136.96	-86.97	1.00	93	23.56	26.43
6	0.034	49.79 AV	116.96	-67.17	1.00	93	23.36	26.43
7	0.048	46.20 PK	133.96	-87.76	1.00	343	22.83	23.37
8	0.048	46.05 AV	113.97	-67.92	1.00	343	22.68	23.37
9	0.065	41.60 PK	131.33	-89.73	1.00	2	20.74	20.86
10	0.065	41.45 AV	111.34	-69.89	1.00	2	20.59	20.86
11	0.131	32.55 PK	125.25	-92.70	1.00	218	17.76	14.79
12	0.131	32.36 AV	105.26	-72.90	1.00	218	17.57	14.79

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

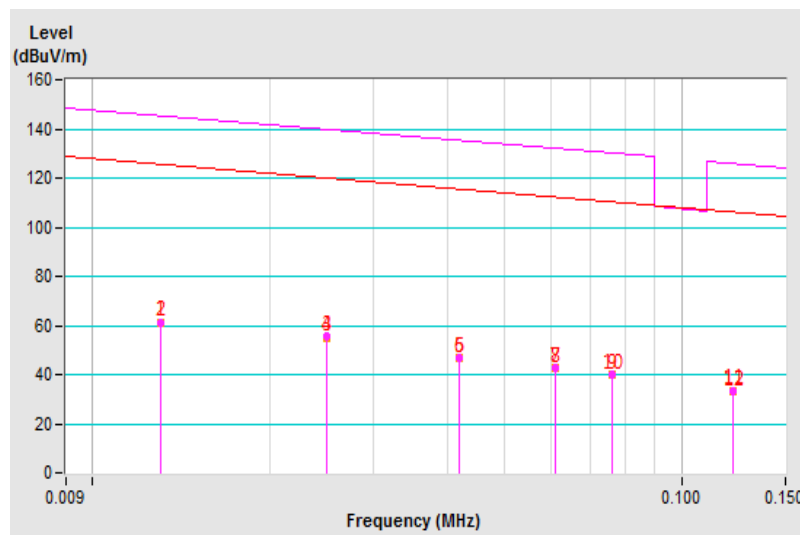


Frequency Range	9kHz ~ 150kHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 200Hz
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Antenna Polarity & Test Distance : Ground-parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.013	61.35 PK	145.31	-83.96	1.00	137	26.42	34.93
2	0.013	61.19 AV	125.31	-64.12	1.00	137	26.26	34.93
3	0.025	55.41 PK	139.63	-84.22	1.00	325	25.96	29.45
4	0.025	55.21 AV	119.63	-64.42	1.00	325	25.76	29.45
5	0.042	46.70 PK	135.12	-88.42	1.00	100	22.03	24.67
6	0.042	46.49 AV	115.13	-68.64	1.00	100	21.82	24.67
7	0.061	42.66 PK	131.88	-89.22	1.00	67	21.25	21.41
8	0.061	42.50 AV	111.89	-69.39	1.00	67	21.09	21.41
9	0.076	39.94 PK	129.97	-90.03	1.00	111	20.59	19.35
10	0.076	39.76 AV	109.98	-70.22	1.00	111	20.41	19.35
11	0.122	33.40 PK	125.87	-92.47	1.00	358	18.25	15.15
12	0.122	33.19 AV	105.87	-72.68	1.00	358	18.04	15.15

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

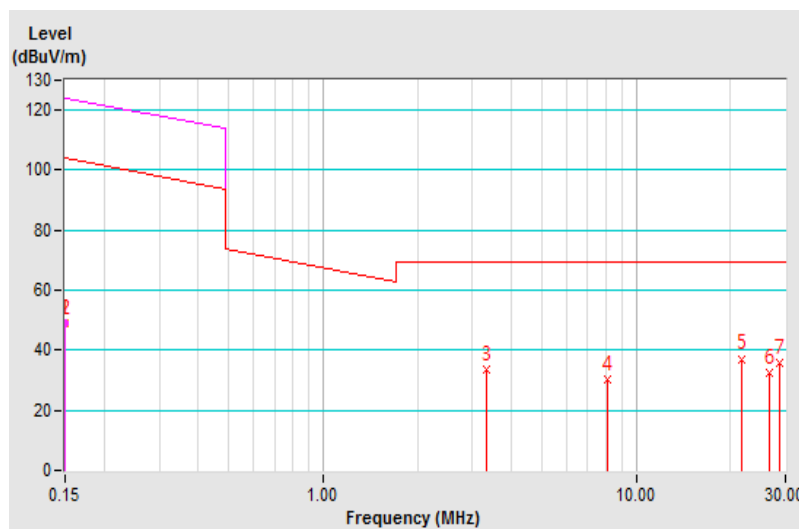


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Peak (PK) / Quasi-Peak (QP) / Average (AV), 9kHz
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Antenna Polarity & Test Distance : Parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.150	48.97 PK	124.08	-75.11	1.00	182	34.97	14.00
2	0.150	48.82 AV	104.08	-55.26	1.00	182	34.82	14.00
3	3.340	33.57 QP	69.50	-35.93	1.00	177	37.42	-3.85
4	8.113	30.41 QP	69.50	-39.09	1.00	215	33.83	-3.42
5	21.663	37.16 QP	69.50	-32.34	1.00	321	41.61	-4.45
6	26.611	32.27 QP	69.50	-37.23	1.00	333	35.88	-3.61
7	28.685	35.82 QP	69.50	-33.68	1.00	11	39.09	-3.27

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



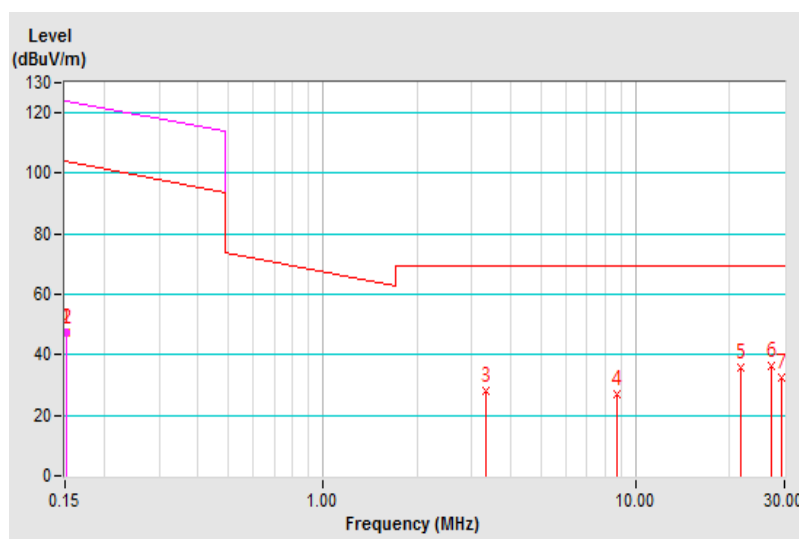
Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Peak (PK) / Quasi-Peak (QP) / Average (AV), 9kHz
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Antenna Polarity & Test Distance : Perpendicular at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.152	47.55 PK	123.96	-76.41	1.00	30	33.63	13.92
2	0.152	47.34 AV	103.96	-56.62	1.00	30	33.42	13.92
3	3.345	27.85 QP	69.50	-41.65	1.00	277	31.70	-3.85
4	8.742	26.97 QP	69.50	-42.53	1.00	174	30.29	-3.32
5	21.664	35.82 QP	69.50	-33.68	1.00	163	40.27	-4.45
6	27.120	36.48 QP	69.50	-33.02	1.00	23	40.00	-3.52
7	29.237	32.68 QP	69.50	-36.82	1.00	139	35.86	-3.18

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

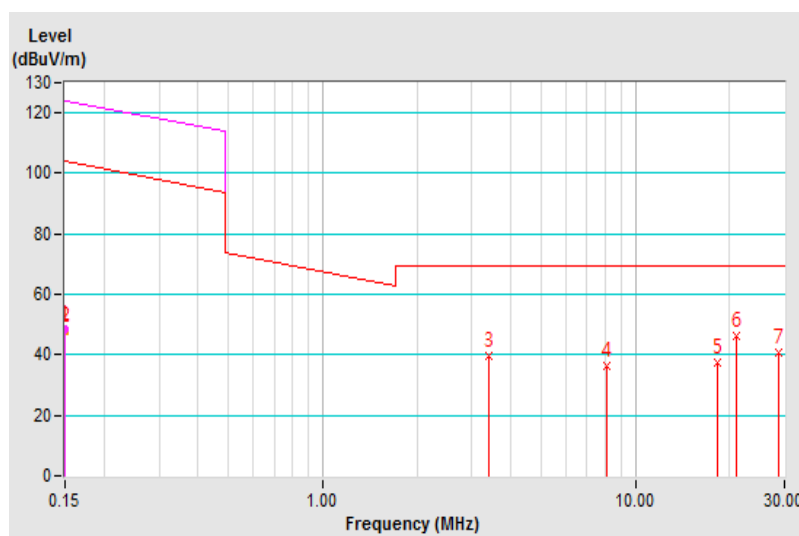


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Peak (PK) / Quasi-Peak (QP) / Average (AV), 9kHz
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Antenna Polarity & Test Distance : Ground-parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.150	48.20 PK	124.08	-75.88	1.00	148	34.20	14.00
2	0.150	48.05 AV	104.08	-56.03	1.00	148	34.05	14.00
3	3.404	39.88 QP	69.50	-29.62	1.00	251	43.72	-3.84
4	8.140	36.14 QP	69.50	-33.36	1.00	3	39.55	-3.41
5	18.244	37.67 QP	69.50	-31.83	1.00	243	42.12	-4.45
6	21.113	46.33 QP	69.50	-23.17	1.00	13	50.88	-4.55
7	28.688	40.51 QP	69.50	-28.99	1.00	162	43.78	-3.27

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

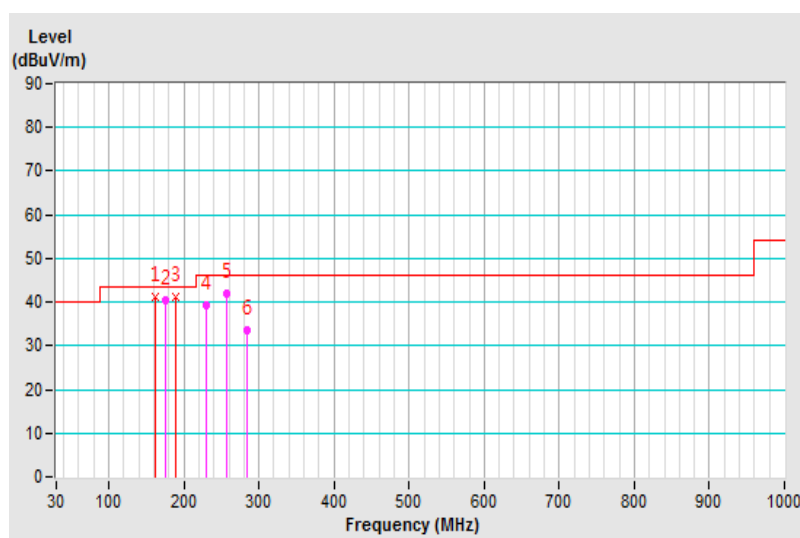


Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
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Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	162.710	41.20 QP	43.50	-2.30	1.50	247	48.10	-6.90
2	176.300	40.50 QP	43.50	-3.00	1.50	94	48.40	-7.90
3	189.850	41.30 QP	43.50	-2.20	1.50	224	50.80	-9.50
4	230.520	39.30 QP	46.00	-6.70	1.50	104	48.30	-9.00
5	257.660	41.80 QP	46.00	-4.20	1.00	113	49.60	-7.80
6	284.790	33.50 QP	46.00	-12.50	1.00	106	39.90	-6.40

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

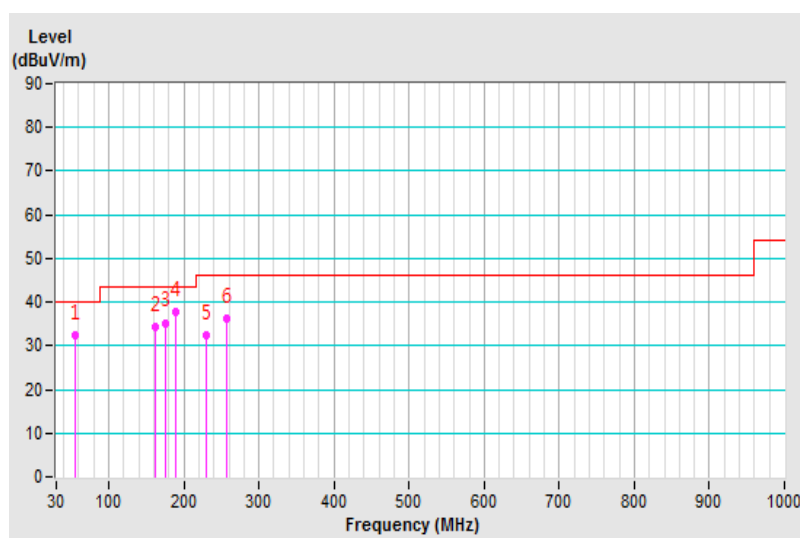


Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
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Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	54.250	32.20 QP	40.00	-7.80	1.00	303	40.00	-7.80
2	162.720	34.40 QP	43.50	-9.10	1.00	284	41.30	-6.90
3	176.280	35.30 QP	43.50	-8.20	1.00	25	43.20	-7.90
4	189.860	37.80 QP	43.50	-5.70	1.00	30	47.30	-9.50
5	230.500	32.40 QP	46.00	-13.60	2.00	171	41.40	-9.00
6	257.660	36.30 QP	46.00	-9.70	1.50	164	44.10	-7.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



Type F

Frequency Range	13.11MHz ~ 14.01MHz	Detector Function & Bandwidth	Quasi-Peak (QP), 9kHz
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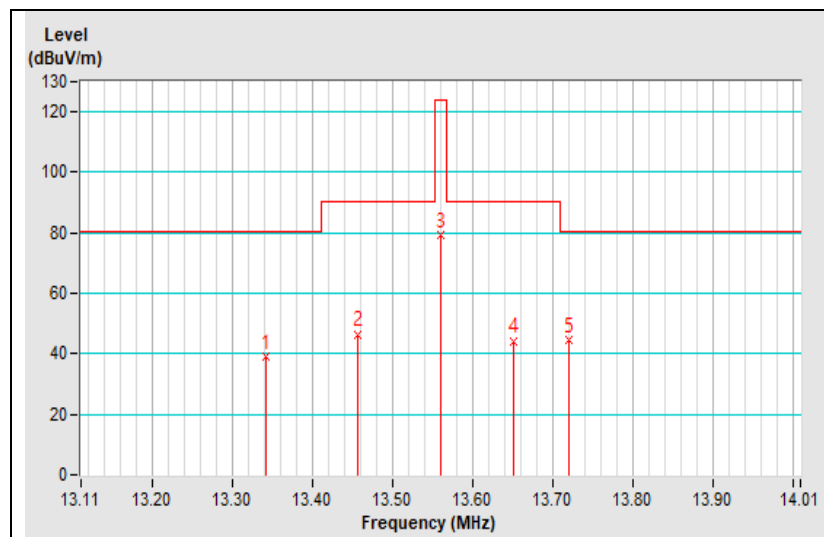
Antenna Polarity & Test Distance : Parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.342	38.88 QP	80.50	-41.62	1.00	360	42.54	-3.66
2	13.457	46.52 QP	90.47	-43.95	1.00	360	50.20	-3.68
3	*13.560	79.31 QP	124.00	-44.69	1.00	360	83.01	-3.70
4	13.652	44.32 QP	90.47	-46.15	1.00	360	48.04	-3.72
5	13.720	44.42 QP	80.50	-36.08	1.00	360	48.15	-3.73

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Above limits have been translated by the formula
 6. " * ": Fundamental frequency.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\mu\text{V/m} & 30\text{m} \\
 &= 84\text{dBuV/m} & 30\text{m} \\
 &= 84+20\log(30/3)^2 & 3\text{m} \\
 &= 124\text{dBuV/m}
 \end{aligned}$$



Frequency Range	13.11MHz ~ 14.01MHz	Detector Function & Bandwidth	Quasi-Peak (QP), 9kHz
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Antenna Polarity & Test Distance : Perpendicular at 3 m

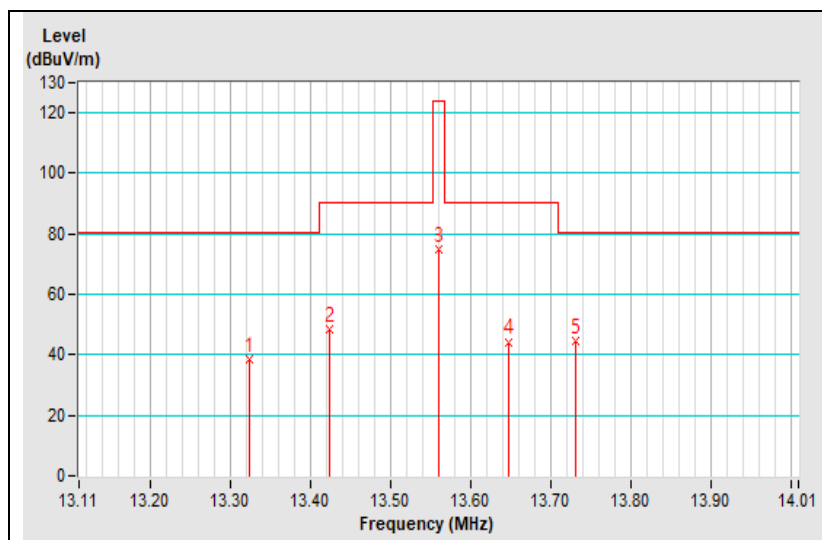
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.323	38.69 QP	80.50	-41.81	1.00	22	42.34	-3.65
2	13.423	48.40 QP	90.47	-42.07	1.00	22	52.07	-3.67
3	*13.560	75.06 QP	124.00	-48.94	1.00	22	78.76	-3.70
4	13.648	44.33 QP	90.47	-46.14	1.00	22	48.05	-3.72
5	13.732	44.35 QP	80.50	-36.15	1.00	22	48.08	-3.73

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Above limits have been translated by the formula
 6. " * ": Fundamental frequency.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\mu\text{V/m} && 30\text{m} \\
 &= 84\text{dBuV/m} && 30\text{m} \\
 &= 84+20\log(30/3)^2 && 3\text{m} \\
 &= 124\text{dBuV/m}
 \end{aligned}$$



Frequency Range	13.11MHz ~ 14.01MHz	Detector Function & Bandwidth	Quasi-Peak (QP), 9kHz
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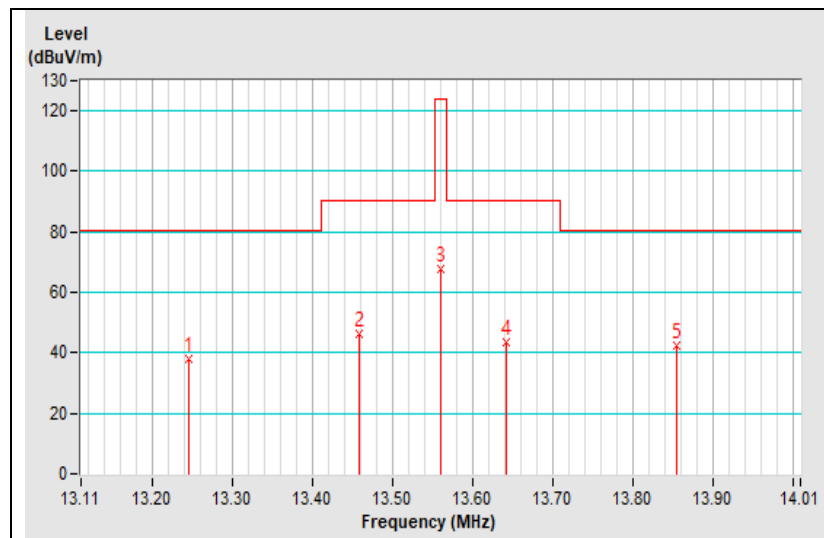
Antenna Polarity & Test Distance : Ground-parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.244	37.88 QP	80.50	-42.62	1.00	243	41.53	-3.65
2	13.458	46.42 QP	90.47	-44.05	1.00	243	50.10	-3.68
3	*13.560	67.86 QP	124.00	-56.14	1.00	243	71.56	-3.70
4	13.642	43.33 QP	90.47	-47.14	1.00	243	47.05	-3.72
5	13.856	42.44 QP	80.50	-38.06	1.00	243	46.19	-3.75

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor(dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Above limits have been translated by the formula
 6. " * ": Fundamental frequency.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\text{uV/m} & 30\text{m} \\
 &= 84\text{dBuV/m} & 30\text{m} \\
 &= 84+20\log(30/3)^2 & 3\text{m} \\
 &= 124\text{dBuV/m}
 \end{aligned}$$

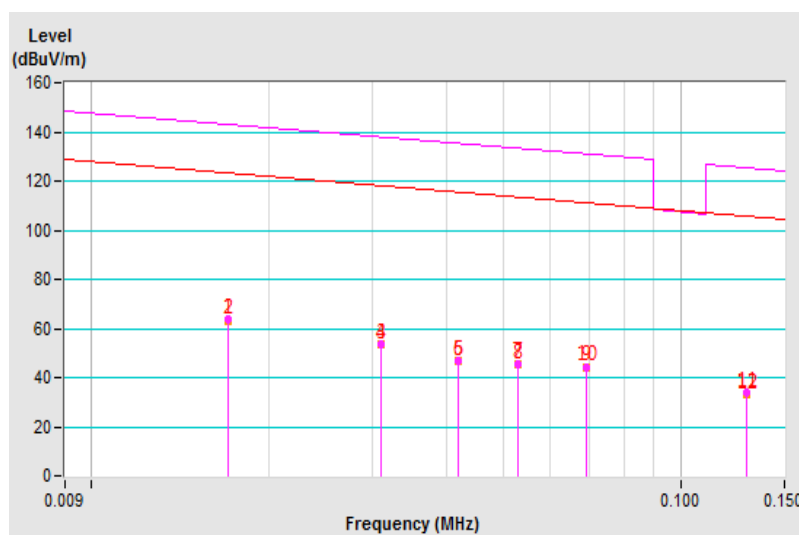


Frequency Range	9kHz ~ 150kHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 200Hz
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Antenna Polarity & Test Distance : Parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.017	63.56 PK	142.98	-79.42	1.00	125	30.54	33.02
2	0.017	63.37 AV	122.98	-59.61	1.00	125	30.35	33.02
3	0.031	53.41 PK	137.76	-84.35	1.00	217	26.32	27.09
4	0.031	53.25 AV	117.77	-64.52	1.00	217	26.16	27.09
5	0.042	46.75 PK	135.12	-88.37	1.00	28	22.08	24.67
6	0.042	46.57 AV	115.13	-68.56	1.00	28	21.90	24.67
7	0.053	45.58 PK	133.10	-87.52	1.00	229	23.06	22.52
8	0.053	45.47 AV	113.11	-67.64	1.00	229	22.95	22.52
9	0.069	44.36 PK	130.81	-86.45	1.00	167	24.05	20.31
10	0.069	44.20 AV	110.82	-66.62	1.00	167	23.89	20.31
11	0.129	33.60 PK	125.39	-91.79	1.00	30	18.72	14.88
12	0.129	33.30 AV	105.39	-72.09	1.00	30	18.42	14.88

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

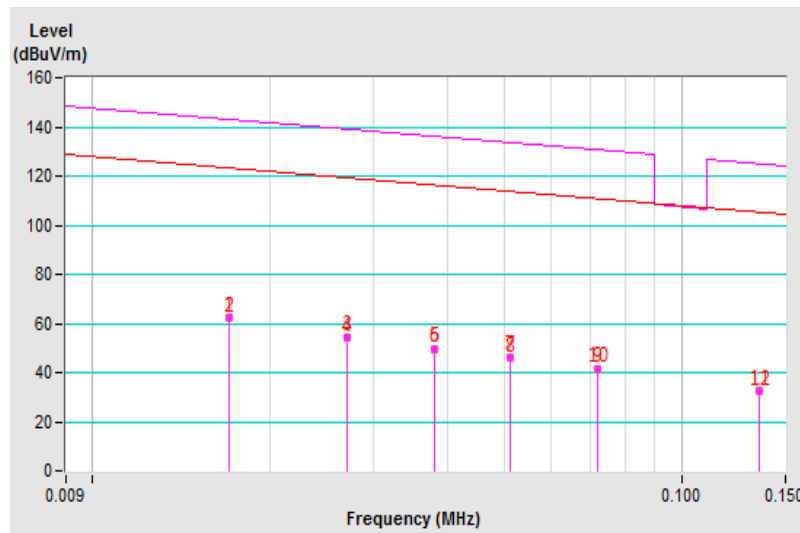


Frequency Range	9kHz ~ 150kHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 200Hz
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Antenna Polarity & Test Distance : Perpendicular at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.017	62.27 PK	142.98	-80.71	1.00	144	29.25	33.02
2	0.017	62.15 AV	122.98	-60.83	1.00	144	29.13	33.02
3	0.027	54.49 PK	138.96	-84.47	1.00	101	25.90	28.59
4	0.027	54.29 AV	118.96	-64.67	1.00	101	25.70	28.59
5	0.038	49.82 PK	135.99	-86.17	1.00	102	24.28	25.54
6	0.038	49.67 AV	116.00	-66.33	1.00	102	24.13	25.54
7	0.051	46.23 PK	133.43	-87.20	1.00	339	23.43	22.80
8	0.051	46.01 AV	113.44	-67.43	1.00	339	23.21	22.80
9	0.072	41.65 PK	130.44	-88.79	1.00	16	21.75	19.90
10	0.072	41.51 AV	110.45	-68.94	1.00	16	21.61	19.90
11	0.135	32.61 PK	124.99	-92.38	1.00	226	17.98	14.63
12	0.135	32.40 AV	104.99	-72.59	1.00	226	17.77	14.63

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

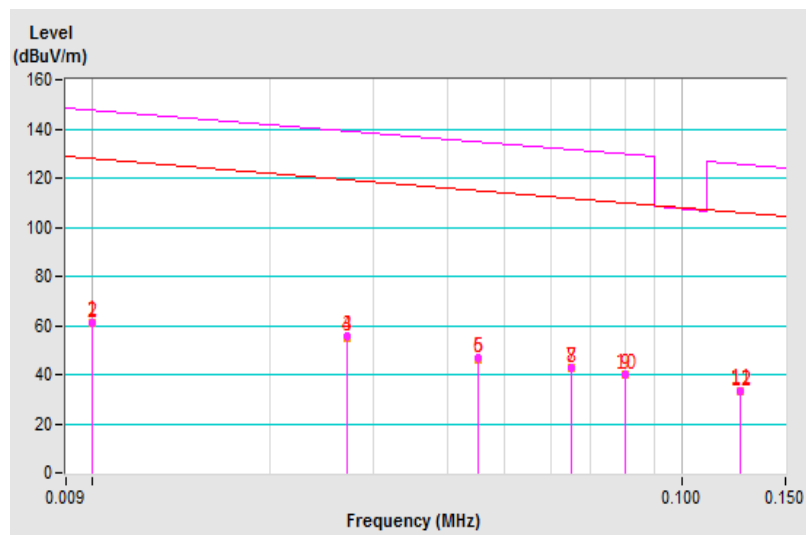


Frequency Range	9kHz ~ 150kHz	Detector Function & Bandwidth	Peak (PK) / Average (AV), 200Hz
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Antenna Polarity & Test Distance : Ground-parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.010	61.29 PK	147.58	-86.29	1.00	142	24.93	36.36
2	0.010	61.09 AV	127.59	-66.50	1.00	142	24.73	36.36
3	0.027	55.38 PK	138.96	-83.58	1.00	321	26.79	28.59
4	0.027	55.17 AV	118.96	-63.79	1.00	321	26.58	28.59
5	0.045	46.67 PK	134.52	-87.85	1.00	117	22.65	24.02
6	0.045	46.44 AV	114.53	-68.09	1.00	117	22.42	24.02
7	0.065	42.72 PK	131.33	-88.61	1.00	82	21.86	20.86
8	0.065	42.53 AV	111.34	-68.81	1.00	82	21.67	20.86
9	0.080	39.97 PK	129.52	-89.55	1.00	124	21.17	18.80
10	0.080	39.82 AV	109.54	-69.72	1.00	124	21.02	18.80
11	0.126	33.45 PK	125.59	-92.14	1.00	335	18.44	15.01
12	0.126	33.24 AV	105.59	-72.35	1.00	335	18.23	15.01

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

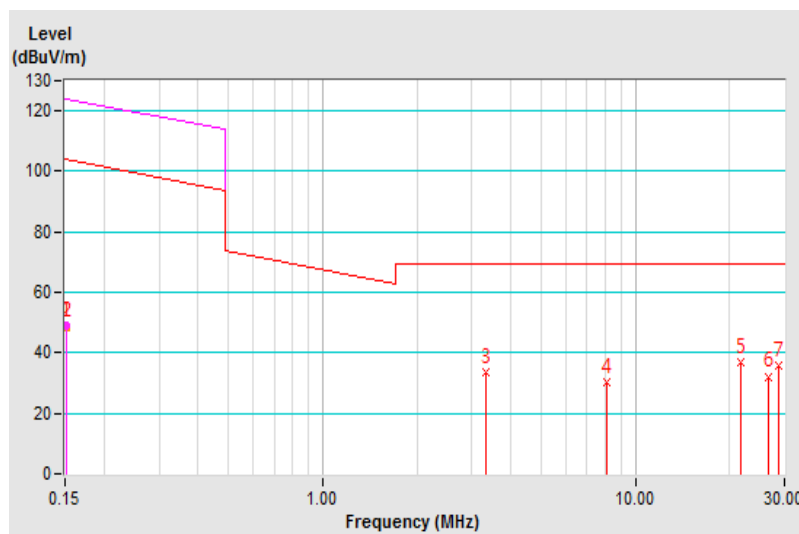


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Peak (PK) / Quasi-Peak (QP) / Average (AV), 9kHz
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Antenna Polarity & Test Distance : Parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.152	48.94 PK	123.96	-75.02	1.00	177	35.02	13.92
2	0.152	48.71 AV	103.96	-55.25	1.00	177	34.79	13.92
3	3.343	33.42 QP	69.50	-36.08	1.00	167	37.27	-3.85
4	8.115	30.31 QP	69.50	-39.19	1.00	198	33.73	-3.42
5	21.666	36.98 QP	69.50	-32.52	1.00	308	41.43	-4.45
6	26.614	32.19 QP	69.50	-37.31	1.00	323	35.80	-3.61
7	28.688	35.75 QP	69.50	-33.75	1.00	43	39.02	-3.27

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

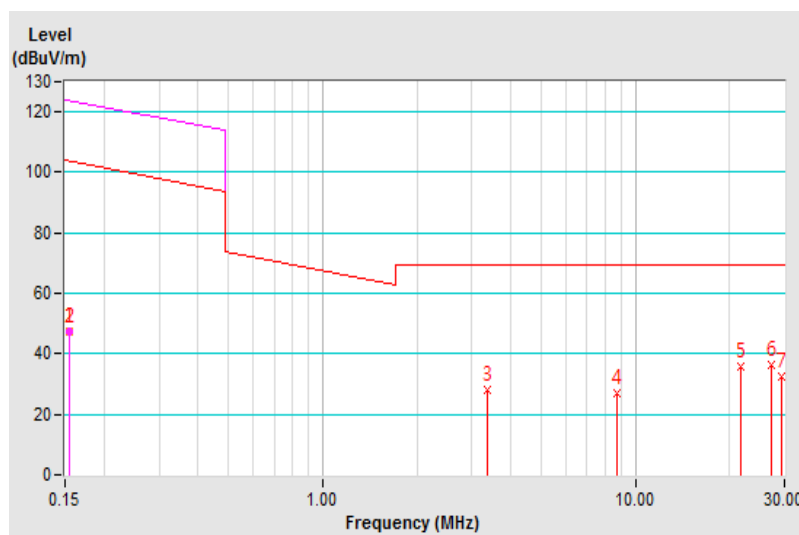


Antenna Polarity & Test Distance : Perpendicular at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.155	47.59 PK	123.80	-76.21	1.00	74	33.79	13.80
2	0.155	47.46 AV	103.80	-56.34	1.00	74	33.66	13.80
3	3.353	28.01 QP	69.50	-41.49	1.00	291	31.86	-3.85
4	8.747	27.06 QP	69.50	-42.44	1.00	188	30.38	-3.32
5	21.667	35.77 QP	69.50	-33.73	1.00	149	40.22	-4.45
6	27.124	36.45 QP	69.50	-33.05	1.00	15	39.97	-3.52
7	29.240	32.60 QP	69.50	-36.90	1.00	131	35.78	-3.18

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

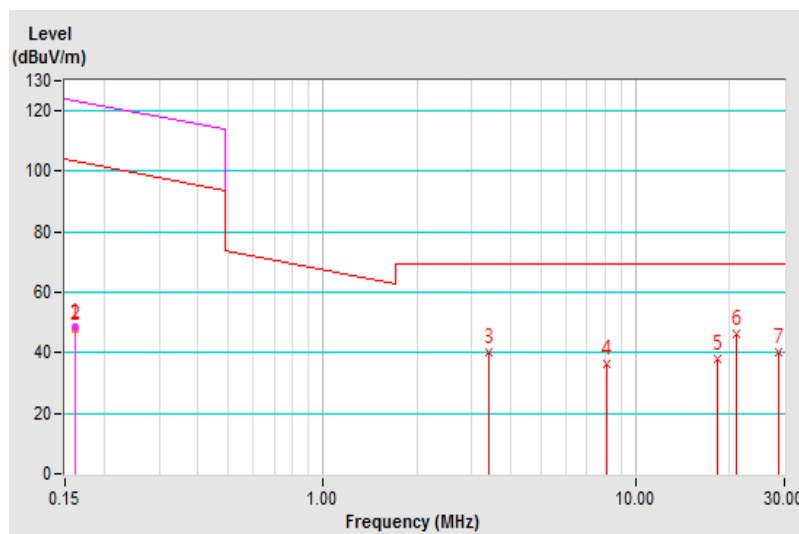


Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Peak (PK) / Quasi-Peak (QP) / Average (AV), 9kHz
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Antenna Polarity & Test Distance : Ground-parallel at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	0.161	48.26 PK	123.47	-75.21	1.00	165	34.71	13.55
2	0.161	48.13 AV	103.47	-55.34	1.00	165	34.58	13.55
3	3.408	40.03 QP	69.50	-29.47	1.00	271	43.87	-3.84
4	8.145	36.29 QP	69.50	-33.21	1.00	26	39.70	-3.41
5	18.248	37.79 QP	69.50	-31.71	1.00	257	42.24	-4.45
6	21.117	46.46 QP	69.50	-23.04	1.00	35	51.01	-4.55
7	28.692	40.41 QP	69.50	-29.09	1.00	175	43.68	-3.27

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

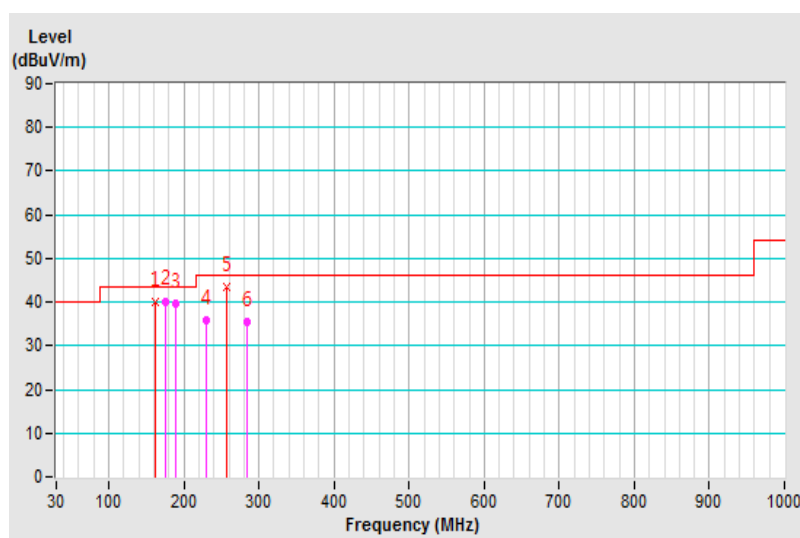


Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
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Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	162.720	40.10 QP	43.50	-3.40	2.00	260	47.00	-6.90
2	176.300	40.20 QP	43.50	-3.30	1.50	260	48.10	-7.90
3	189.860	39.60 QP	43.50	-3.90	1.50	230	49.10	-9.50
4	230.550	35.70 QP	46.00	-10.30	1.50	106	44.70	-9.00
5	257.640	43.50 QP	46.00	-2.50	1.00	106	51.30	-7.80
6	284.770	35.60 QP	46.00	-10.40	1.00	113	42.00	-6.40

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

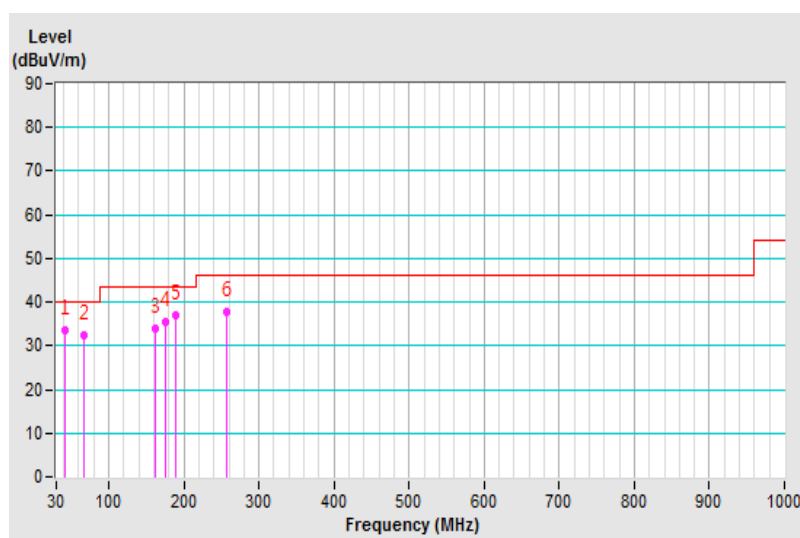


Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
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Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	40.690	33.40 QP	40.00	-6.60	1.00	360	41.40	-8.00
2	67.810	32.50 QP	40.00	-7.50	1.00	292	42.00	-9.50
3	162.740	33.90 QP	43.50	-9.60	1.50	334	40.80	-6.90
4	176.280	35.40 QP	43.50	-8.10	1.00	61	43.30	-7.90
5	189.860	37.10 QP	43.50	-6.40	1.00	39	46.60	-9.50
6	257.660	37.90 QP	46.00	-8.10	2.00	177	45.70	-7.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

- Note: 1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 30, 2019	Aug. 29, 2020
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
- 3 Tested Date: May 15, 2020

4.2.3 Test Procedures

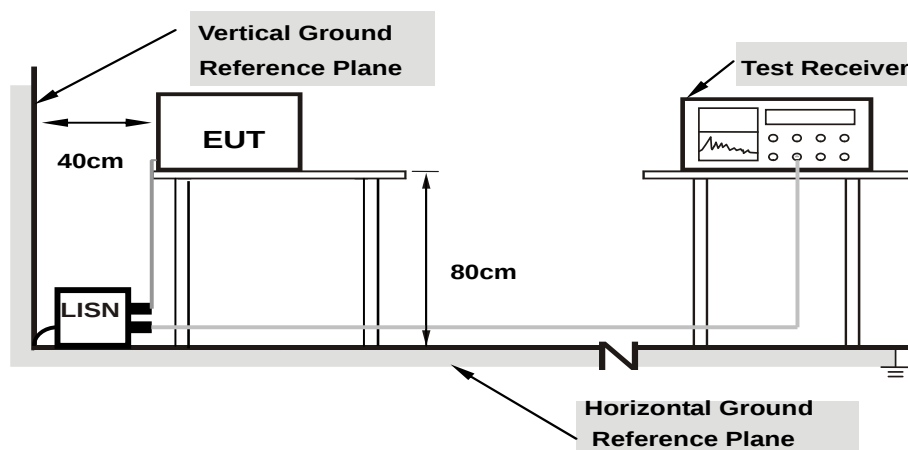
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

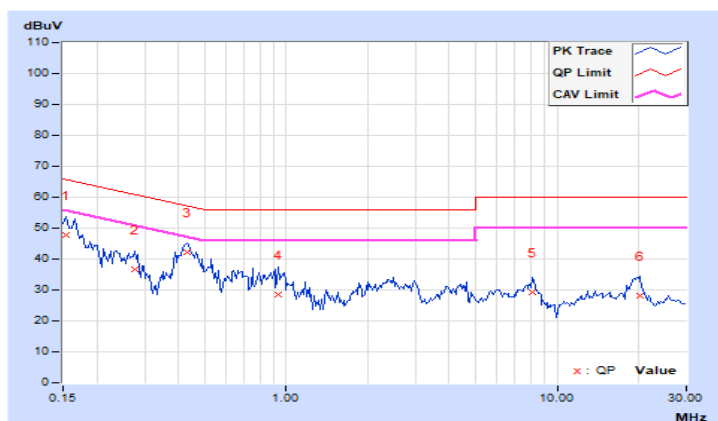
Type A

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.97	37.87	21.59	47.84	31.56	65.79	55.79	-17.95	-24.23
2	0.27500	9.97	26.54	18.70	36.51	28.67	60.97	50.97	-24.46	-22.30
3	0.43125	9.98	32.17	26.29	42.15	36.27	57.23	47.23	-15.08	-10.96
4	0.93906	10.02	18.35	10.89	28.37	20.91	56.00	46.00	-27.63	-25.09
5	8.08203	10.38	18.97	12.77	29.35	23.15	60.00	50.00	-30.65	-26.85
6	20.32422	11.06	17.22	11.48	28.28	22.54	60.00	50.00	-31.72	-27.46

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

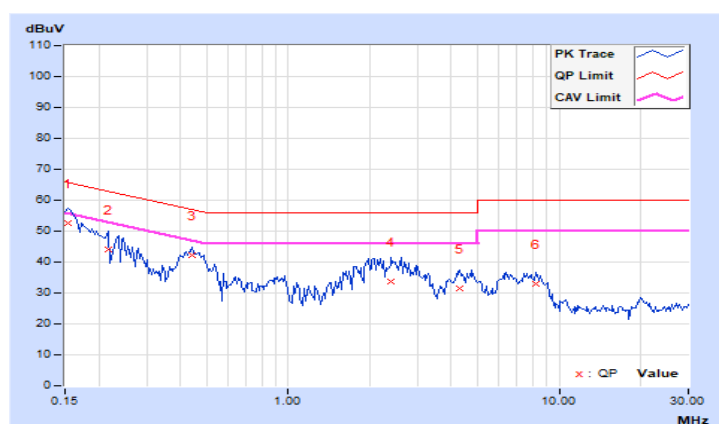


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.97	42.62	26.23	52.59	36.20	65.79	55.79	-13.20	-19.59
2	0.21641	9.97	33.98	17.84	43.95	27.81	62.96	52.96	-19.01	-25.15
3	0.43906	9.98	32.16	26.06	42.14	36.04	57.08	47.08	-14.94	-11.04
4	2.40625	10.08	23.78	18.18	33.86	28.26	56.00	46.00	-22.14	-17.74
5	4.30859	10.15	21.35	15.03	31.50	25.18	56.00	46.00	-24.50	-20.82
6	8.23047	10.32	22.82	15.77	33.14	26.09	60.00	50.00	-26.86	-23.91

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



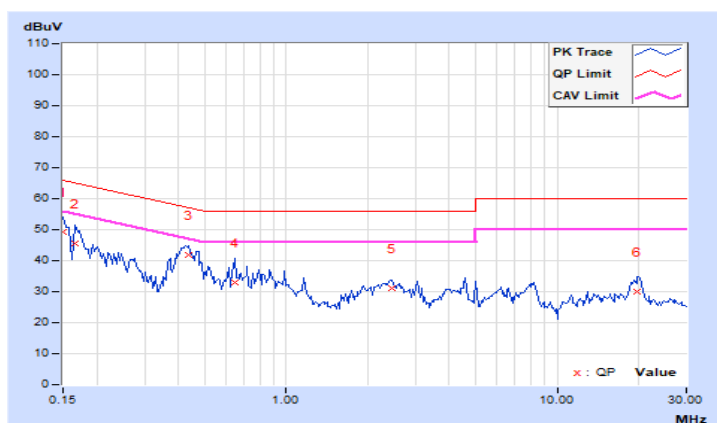
Type B

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.97	39.11	22.25	49.08	32.22	66.00	56.00	-16.92	-23.78
2	0.16562	9.97	35.41	19.19	45.38	29.16	65.18	55.18	-19.80	-26.02
3	0.43516	9.98	31.94	25.97	41.92	35.95	57.15	47.15	-15.23	-11.20
4	0.64609	10.00	23.14	15.85	33.14	25.85	56.00	46.00	-22.86	-20.15
5	2.44141	10.09	20.88	15.50	30.97	25.59	56.00	46.00	-25.03	-20.41
6	19.74219	11.04	18.94	13.26	29.98	24.30	60.00	50.00	-30.02	-25.70

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

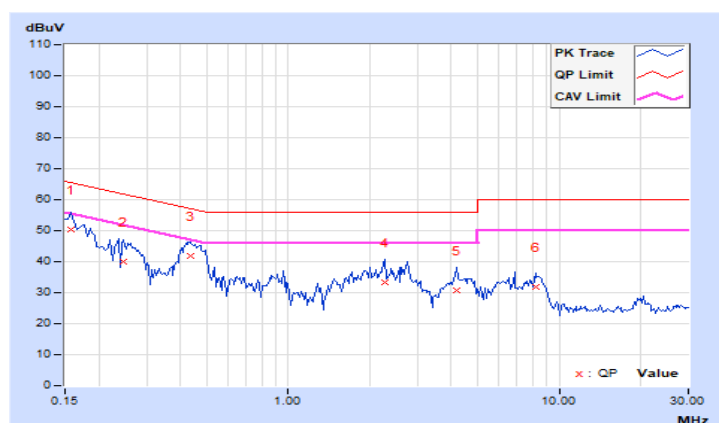


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBUV)		Emission Level (dBUV)		Limit (dBUV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	9.97	40.51	21.03	50.48	31.00	65.58	55.58	-15.10	-24.58
2	0.24766	9.97	30.13	16.03	40.10	26.00	61.84	51.84	-21.74	-25.84
3	0.43516	9.98	32.02	25.77	42.00	35.75	57.15	47.15	-15.15	-11.40
4	2.27734	10.07	23.08	17.43	33.15	27.50	56.00	46.00	-22.85	-18.50
5	4.19531	10.15	20.64	14.63	30.79	24.78	56.00	46.00	-25.21	-21.22
6	8.18750	10.31	21.68	15.71	31.99	26.02	60.00	50.00	-28.01	-23.98

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



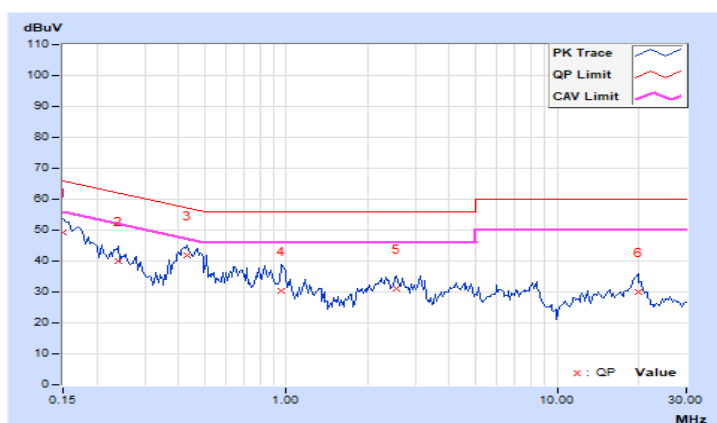
Type F

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.97	39.44	23.03	49.41	33.00	66.00	56.00	-16.59	-23.00
2	0.23984	9.97	29.97	20.32	39.94	30.29	62.10	52.10	-22.16	-21.81
3	0.43125	9.98	31.94	25.77	41.92	35.75	57.23	47.23	-15.31	-11.48
4	0.95469	10.02	20.26	11.83	30.28	21.85	56.00	46.00	-25.72	-24.15
5	2.56641	10.10	20.93	15.43	31.03	25.53	56.00	46.00	-24.97	-20.47
6	19.88281	11.04	19.01	13.29	30.05	24.33	60.00	50.00	-29.95	-25.67

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBUV)		Emission Level (dBUV)		Limit (dBUV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	9.97	39.99	22.83	49.96	32.80	65.38	55.38	-15.42	-22.58
2	0.25156	9.97	28.67	16.57	38.64	26.54	61.71	51.71	-23.07	-25.17
3	0.42734	9.98	31.46	24.79	41.44	34.77	57.30	47.30	-15.86	-12.53
4	2.19531	10.07	22.94	17.37	33.01	27.44	56.00	46.00	-22.99	-18.56
5	4.25000	10.15	20.37	14.24	30.52	24.39	56.00	46.00	-25.48	-21.61
6	8.50391	10.33	20.44	13.07	30.77	23.40	60.00	50.00	-29.23	-26.60

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

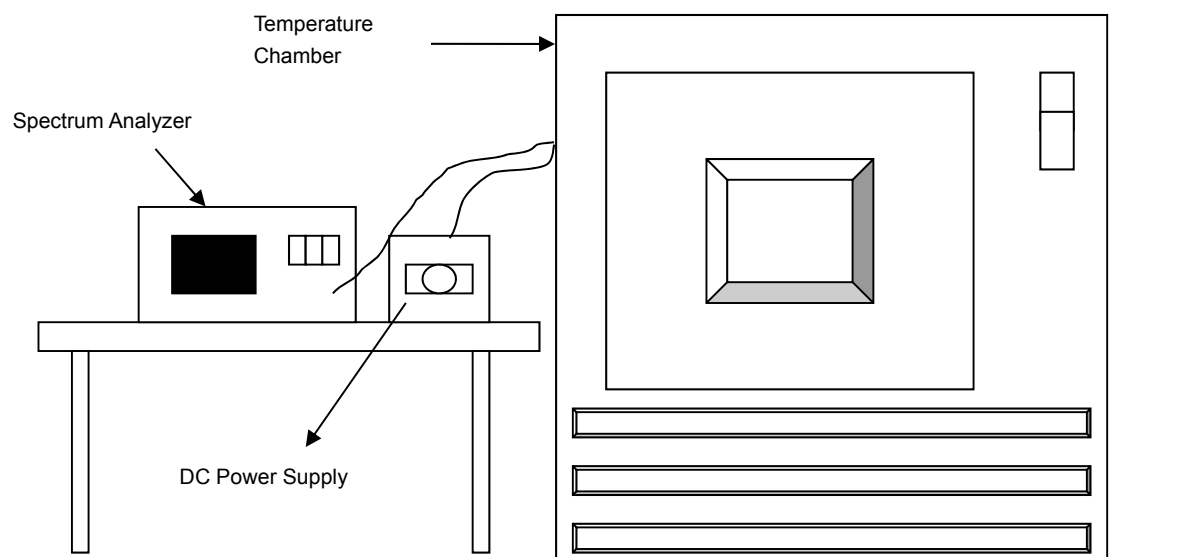


4.3 Frequency Stability

4.3.1 Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
- The test chamber was allowed to stabilize at $+20$ degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

Same as Item 4.1.6.

4.3.7 Test Result

Frequency Stability Versus Temp.									
Temp. (°C)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
80	3.3	13.55993	-0.00052	13.55993	-0.00052	13.55993	-0.00052	13.55993	-0.00052
70	3.3	13.56002	0.00015	13.56001	0.00007	13.56002	0.00015	13.56001	0.00007
60	3.3	13.55994	-0.00044	13.55994	-0.00044	13.55994	-0.00044	13.55994	-0.00044
50	3.3	13.56002	0.00015	13.56002	0.00015	13.56002	0.00015	13.56002	0.00015
40	3.3	13.55998	-0.00015	13.55999	-0.00007	13.55999	-0.00007	13.55998	-0.00015
30	3.3	13.55998	-0.00015	13.55999	-0.00007	13.55998	-0.00015	13.55998	-0.00015
20	3.3	13.56004	0.00029	13.56003	0.00022	13.56003	0.00022	13.56004	0.00029
10	3.3	13.55998	-0.00015	13.55998	-0.00015	13.55998	-0.00015	13.55998	-0.00015
0	3.3	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044	13.56006	0.00044
-10	3.3	13.55997	-0.00022	13.55997	-0.00022	13.55997	-0.00022	13.55996	-0.00029
-20	3.3	13.56003	0.00022	13.56003	0.00022	13.56004	0.00029	13.56003	0.00022
-25	3.3	13.55999	-0.00007	13.55999	-0.00007	13.55999	-0.00007	13.55999	-0.00007

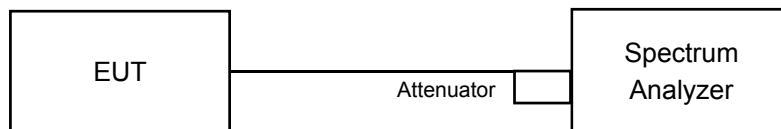
Frequency Stability Versus Voltage									
Temp. (°C)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	4.43	13.56004	0.00029	13.56003	0.00022	13.56003	0.00022	13.56004	0.00029
	3.3	13.56004	0.00029	13.56003	0.00022	13.56003	0.00022	13.56004	0.00029
	3.27	13.56004	0.00029	13.56003	0.00022	13.56003	0.00022	13.56004	0.00029

4.4 20dB Bandwidth

4.4.1 Limits of 20dB BANDWIDTH Measurement

The 20dB bandwidth shall be specified in operating frequency band.

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 10Hz RBW and 30Hz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

4.4.5 Deviation from Test Standard

No deviation.

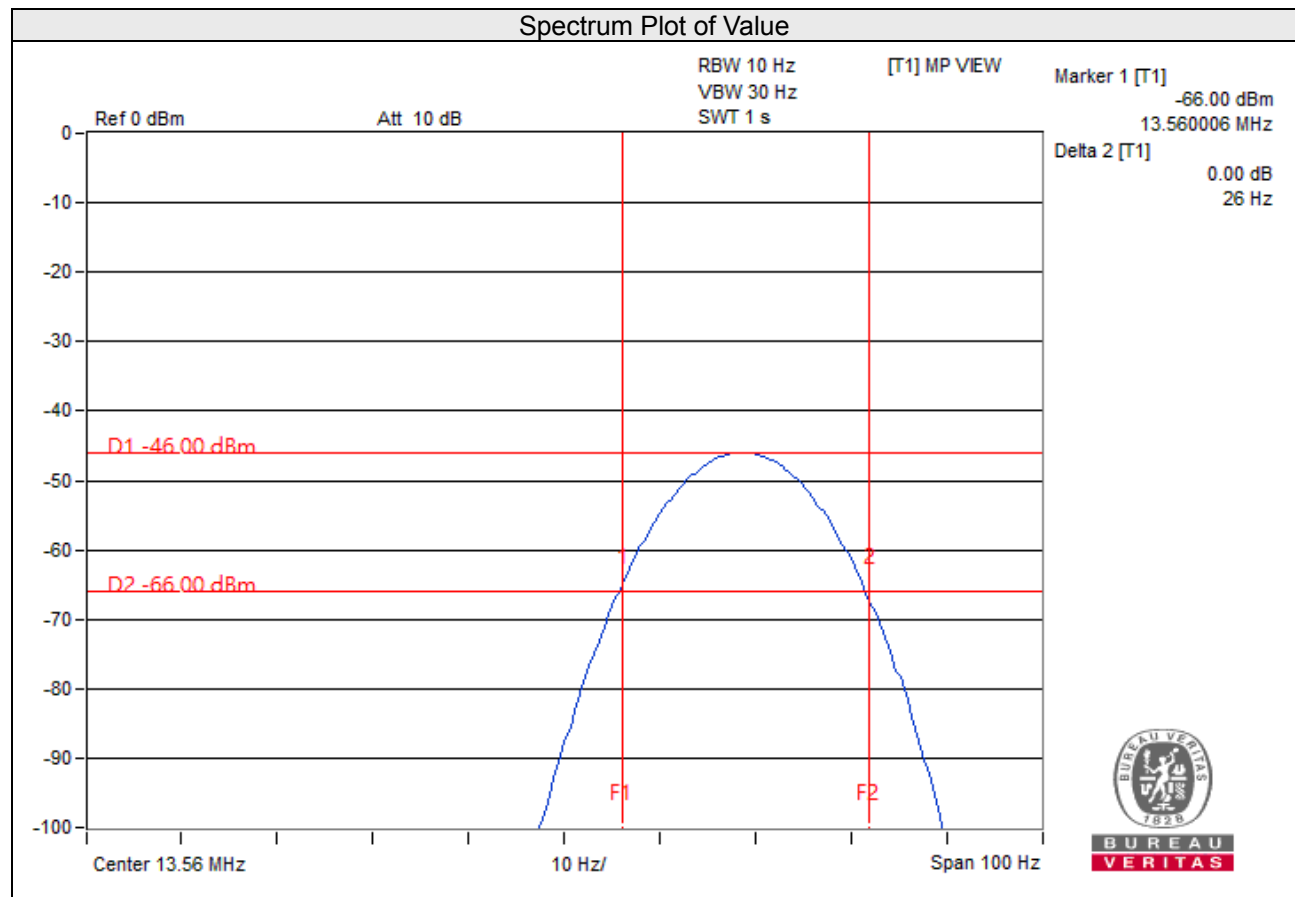
4.4.6 EUT Operating Conditions

Same as Item 4.1.6.

4.4.7 Test Results

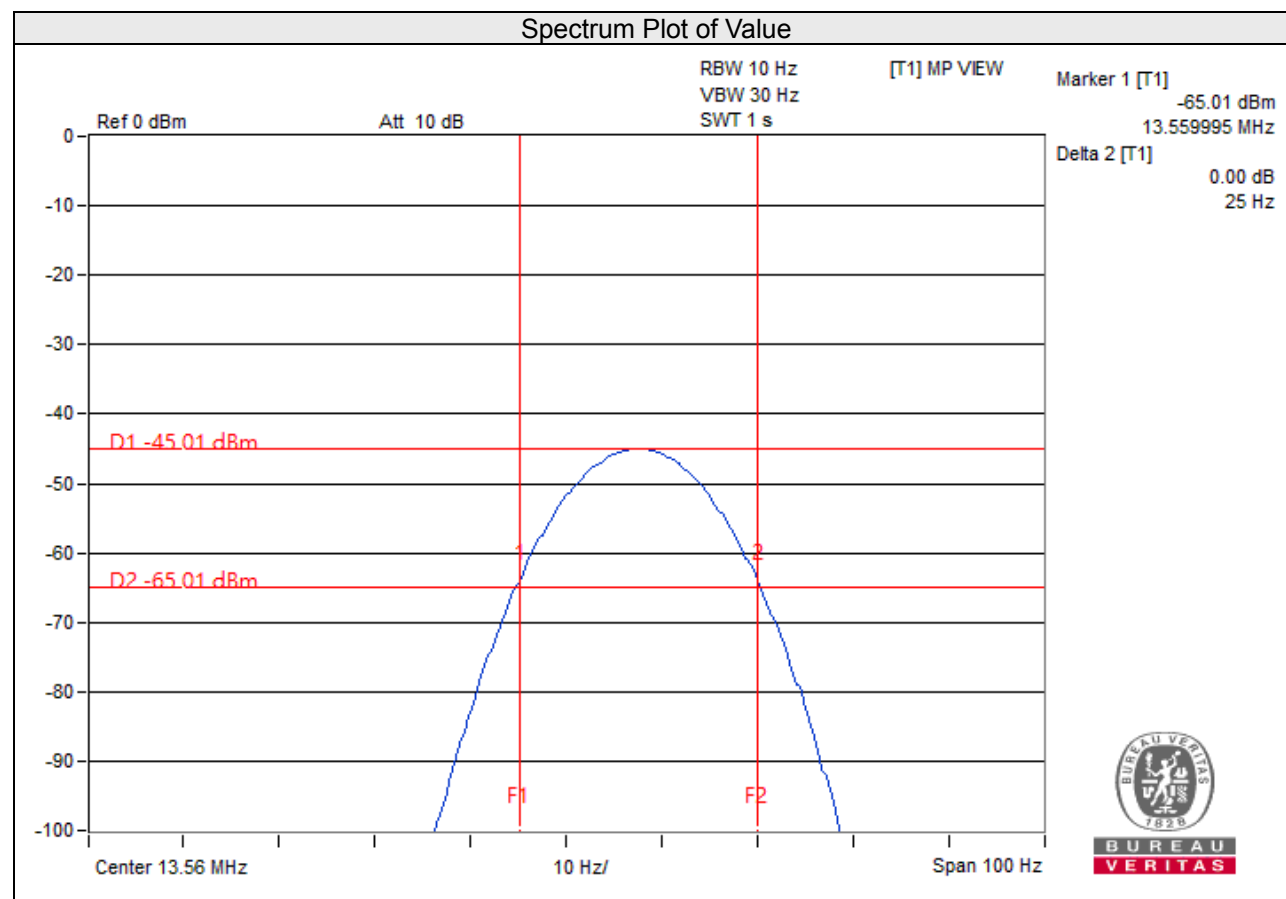
Type A

20dBc Point (Low) (MHz)	20dBc Point (High) (MHz)	Operating Frequency Band (MHz)	Pass/Fail
13.560006	13.560032	13.11 – 14.01	Pass



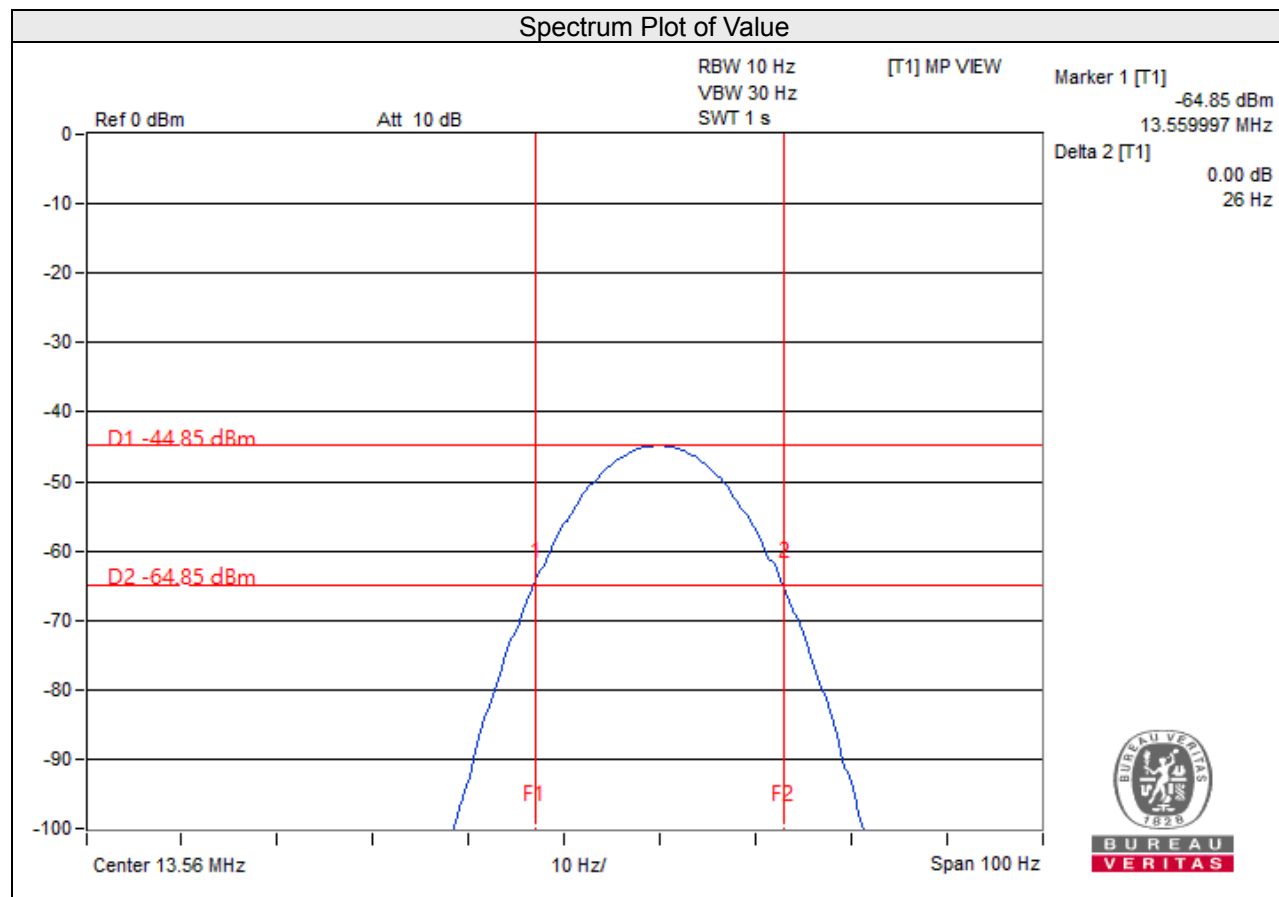
Type B

20dBc Point (Low) (MHz)	20dBc Point (High) (MHz)	Operating Frequency Band (MHz)	Pass/Fail
13.559995	13.56002	13.11 – 14.01	Pass



Type F

20dBc Point (Low) (MHz)	20dBc Point (High) (MHz)	Operating Frequency Band (MHz)	Pass/Fail
13.559997	13.560023	13.11 – 14.01	Pass



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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