FCC Test Report (NFC)

Report No.:	RF171130C29-11
FCC ID:	HD5-CN80L1N
Test Model:	CN80L1N
Received Date:	Dec. 04, 2017
Test Date:	Jan. 15 to 31, 2018
Issued Date:	Mar. 08, 2018
Applicant:	Honeywell International Inc.
Address:	9680 Old Bailes Road, Fort Mill, SC 29707 USA
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 R.O.C.
Test Location :	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF171130C29-11	Original release.	Mar. 08, 2018

1 Certificate of Conformity

Product:	Dolphin CN80
Brand:	Honeywell
Test Model:	CN80L1N
Sample Status:	ENGINEERING SAMPLE
Applicant:	Honeywell International Inc.
Test Date:	Jan. 15 to 31, 2018
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 : Mary Ko , **Date:** Mar. 08, 2018

Mary Ko / Specialist

Approved by : , **Date:** Mar. 08, 2018

May Chen / Manager

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	NA	Without AC power port of the EUT.
15.225 (a)	The field strength of any emissions within the band 13.553-13.567 MHz	PASS	Meet the requirement of limit.
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 -11.9dB at 833.91MHz.
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	No antenna connector is used.

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) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.53 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.08 dB
	6GHz ~ 18GHz	4.98 dB
	18GHz ~ 40GHz	5.19 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (NFC)

Product	Dolphin CN80
Brand	Honeywell
Test Model	CN80L1N
Status of EUT	ENGINEERING SAMPLE
HW Version	Rev 1.1
HW P/N	DVT1
SW Version	OS.01.004-HON.01.004
SW P/N	351D
Power Supply Rating	3.85Vdc from battery
Modulation Type	ASK
Operating Frequency	13.56MHz
Number of Channel	1
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Battery x 1 Touch pen x 1
Data Cable Supplied	NA

Note:

1. There are WWAN, WLAN, Bluetooth, Zigbee and NFC technology used for the EUT. The EUT has three radios as following table:

Radio 1	Radio 2	Radio 3
WLAN+WWAN+BT 1	Zigbee+BT 2	NFC
Note: For Bluetooth technology the Radio 1 support BT 5.0 dual mode, the Radio 2 support BT-LE (4.2) single mode only.		

2. There're 2 configurations for the EUT listed as below.
Sample A: Short K/B-number
Sample B: Short K/B-Qwety
From the above samples, the worst cases were found in **Sample A**. Therefore only the test data of the mode was recorded in this report.

3. Simultaneously transmission condition.

Condition	Technology			
1	WLAN 2.4GHz	NFC	WWAN	Zigbee
2	WLAN 5GHz	NFC	WWAN	Zigbee
3	Bluetooth	NFC	WWAN	Zigbee
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.				

4. The EUT needs to be supplied from battery, the information is as below table:

Brand	Model No.	Spec.
Inventus Power, Inc. / Honeywell	CW-BAT	3.85Vdc, 5800mAh, 22.3Wh

5. The EUT has four 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
	V(ISO15693)	100%, ASK	26.48 kbit/s

6. The antennas provided to the EUT, please refer to the following table:

Radio 1					
WLAN Antenna Spec. / Bluetooth Antenna No. 1 Spec.					
Chain No.	Antenna Gain include trace loss and cable loss (dBi)	Frequency range (GHz)	Antenna type	Connector type	Trace loss and cable loss (dB)
Chain 0	-0.38	2.4~2.4835	PIFA	POGO pin	1.6
	-0.39	5.15~5.25			3
	-0.39	5.25~5.35			
	-0.39	5.47~5.725			
	-0.39	5.725~5.85			
Chain 1	3.36	2.4~2.4835	PIFA	POGO pin	0.6
	3.46	5.15~5.25			1.2
	3.46	5.25~5.35			
	3.46	5.47~5.725			
	3.46	5.725~5.85			
WWAN Antenna Spec.					
Chain No.	Antenna Gain include trace loss (dBi)	Frequency range	Antenna type	Connector type	Trace loss (dB)
Chain 0	0.28	700~960MHz	PIFA	POGO pin	0.4
	1.15	1.70~2.0GHz			0.6
	1.37	2.1~2.4GHz			0.8
	1.02	2.4~2.7GHz			0.9
Chain 1 (RX only)	0.79	700~960MHz	PIFA	POGO pin	0.4
	-0.35	1.70~2.0GHz			0.6
	1.05	2.1~2.4GHz			0.8
	0.37	2.4~2.7GHz			0.9

Radio 2				
Bluetooth Antenna No. 2 Spec. / Zigbee Antenna Spec.				
Antenna Gain include trace loss (dBi)	Frequency range (GHz)	Antenna type	Connector type	Trace loss (dB)
-0.03	2.4~2.4835	PIFA	POGO pin	0.8

Radio 3		
NFC Antenna Spec.		
Frequency range (MHz)	Antenna type	Connector type
13~14	Loop	NA

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

3.2 Description of Test Modes

One channel was provided to this EUT:

Channel	FREQ. (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:** Radiated Emission **PLC:** Power Line Conducted Emission
FS: Frequency Stability **EB:** 20dB Bandwidth measurement

NOTE: 1. No need to concern of Conducted Emission due to the EUT is powered by battery.
2. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane (below 1GHz) & X-plane (above 1GHz)**.

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

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:

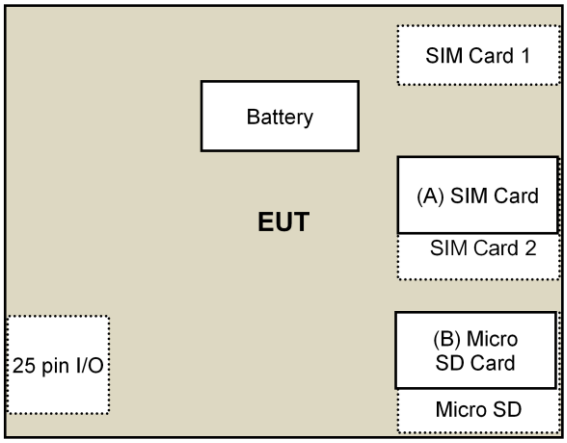
Applicable To	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE	26deg. C, 70%RH	DC 3.85V	Weiwei Lo
FS	25deg. C, 60%RH	DC 3.85V	Jyunchun Lin
EB	25deg. C, 60%RH	DC 3.85V	Jyunchun Lin

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.	SIM Card	NA	NA	NA	NA	Supplied by client
B.	SD Card	NA	NA	NA	NA	Supplied by client

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.

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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. 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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2017	July 11, 2018
Loop Antenna(*) TESEQ	HLA 6121	45745	May 19, 2017	May 18, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 06, 2017	May 05, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 03, 2017	Oct. 02, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Spectrum Analyzer R&S	FSV40	100964	July 1, 2017	June 30, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018
DC Power Supply Topward	6603D	795558	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 10, 2018	Jan. 09, 2019
True RMS Clamp Meter FLUKE	325	31130711WS	May 29, 2017	May 28, 2018

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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4 Loop antenna was used for all emissions below 30 MHz.
5. The CANADA Site Registration No. is 20331-1
6. Tested Date: Jan. 15 to 31, 2018

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. Both X and Y axes 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 Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) 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:

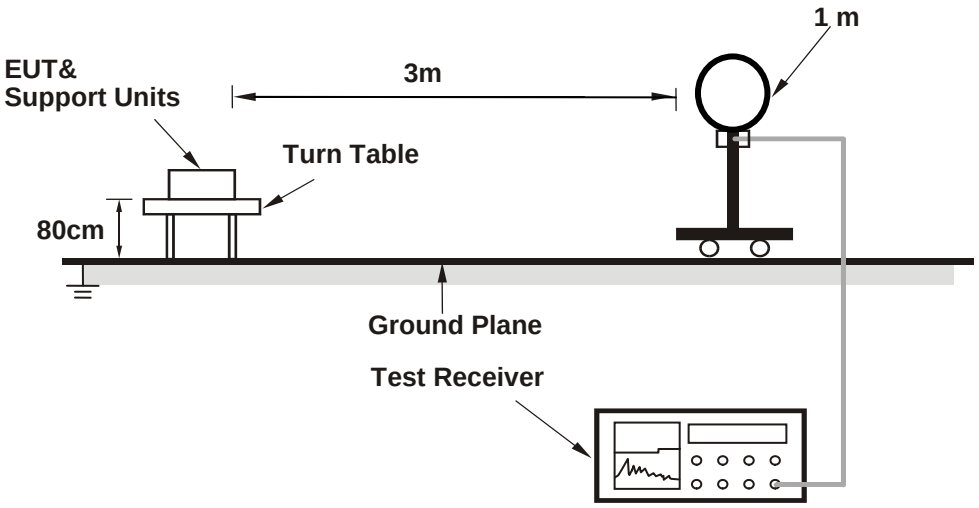
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency above 30MHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

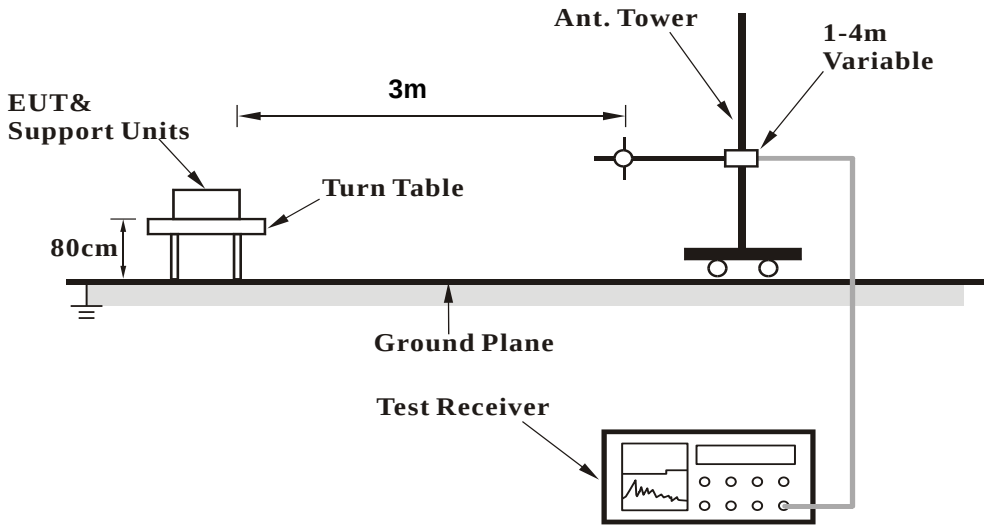
No deviation.

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

a. Connected the EUT with the Laptop.
b. Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Type A

Frequency Range	13.110 ~ 14.010MHz	Detector Function	Quasi-Peak

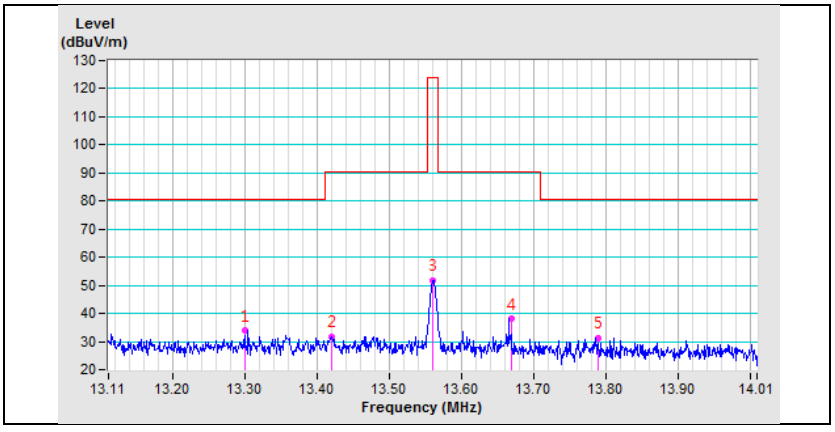
Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.30	33.9 QP	80.5	-46.6	1.00	176	37.1	-3.3
2	13.42	31.8 QP	90.5	-58.7	1.00	176	35.1	-3.3
3	*13.56	51.7 QP			1.00	176	55.0	-3.3
4	13.67	38.1 QP	90.5	-52.4	1.00	176	41.4	-3.3
5	13.79	31.4 QP	80.5	-49.1	1.00	176	34.7	-3.4

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:

13.56MHz = 15848uV/m 30m
= 84dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124dBuV/m



Frequency Range	13.110 ~ 14.010MHz	Detector Function	Quasi-Peak

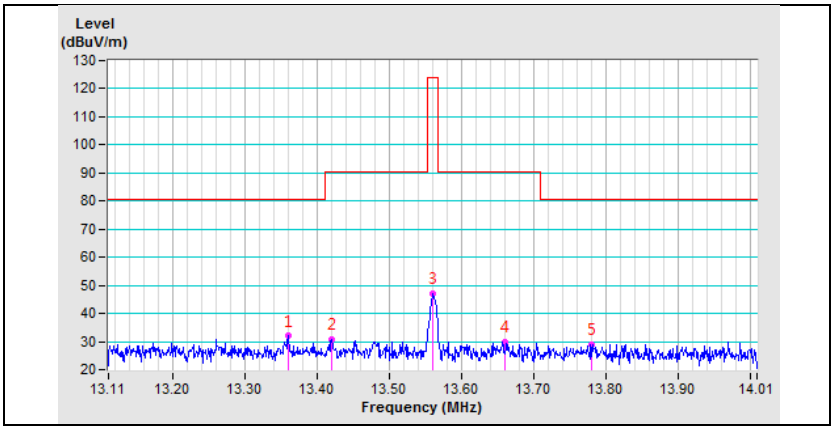
Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.36	32.0 QP	80.5	-48.5	1.00	268	35.3	-3.3
2	13.42	30.8 QP	90.5	-59.7	1.00	268	34.1	-3.3
3	*13.56	47.1 QP			1.00	268	50.4	-3.3
4	13.66	29.8 QP	90.5	-60.7	1.00	268	33.2	-3.3
5	13.78	29.1 QP	80.5	-51.4	1.00	268	32.4	-3.4

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:

13.56MHz = 15848uV/m 30m
= 84dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124dBuV/m



Frequency Range	Below 30MHz	Detector Function	Quasi-Peak

Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	3.84	37.2 QP	69.5	-32.3	1.00	123	40.1	-2.9
2	7.15	36.6 QP	69.5	-32.9	1.00	45	39.5	-2.9
3	10.05	34.5 QP	69.5	-35.0	1.00	321	37.4	-2.8
4	21.33	39.0 QP	69.5	-30.5	1.00	78	43.1	-4.1
5	22.69	44.4 QP	69.5	-25.1	1.00	87	48.1	-3.8
6	29.75	41.5 QP	69.5	-28.0	1.00	233	43.8	-2.2
Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	1.32	24.8 QP	65.2	-40.4	1.00	268	24.7	0.1
2	2.97	23.0 QP	69.5	-46.5	1.00	12	25.9	-2.9
3	8.42	25.4 QP	69.5	-44.1	1.00	36	28.3	-2.9
4	14.49	28.6 QP	69.5	-40.9	1.00	45	32.0	-3.5
5	22.01	34.3 QP	69.5	-35.2	1.00	162	38.2	-3.9
6	24.82	38.4 QP	69.5	-31.1	1.00	123	41.6	-3.2

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 ~ 1000MHz	Detector Function	Quasi-Peak

Antenna Polarity & Test Distance: Horizontal At 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	181.83	21.1 PK	43.5	-22.4	1.50 H	0	31.0	-9.9
2	289.91	22.6 PK	46.0	-23.4	1.50 H	252	30.3	-7.7
3	433.28	26.3 PK	46.0	-19.7	3.00 H	328	30.1	-3.8
4	613.55	30.2 PK	46.0	-15.8	3.00 H	334	30.5	-0.3
5	679.71	30.4 PK	46.0	-15.6	2.00 H	311	29.9	0.5
6	**833.91**	**34.1 PK**	**46.0**	**-11.9**	**2.00 H**	**322**	**31.2**	**2.9**
Antenna Polarity & Test Distance: Vertical At 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	43.77	23.8 PK	40.0	-16.2	1.50 V	145	31.9	-8.1
2	156.00	23.2 PK	43.5	-20.3	1.50 V	360	31.0	-7.8
3	305.12	23.4 PK	46.0	-22.6	1.00 V	71	30.5	-7.1
4	439.66	26.4 PK	46.0	-19.6	3.00 V	360	30.0	-3.6
5	501.18	26.8 PK	46.0	-19.2	3.00 V	360	29.5	-2.7
6	713.53	30.3 PK	46.0	-15.7	1.50 V	226	29.5	0.8

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 B

Frequency Range	13.110 ~ 14.010MHz	Detector Function	Quasi-Peak

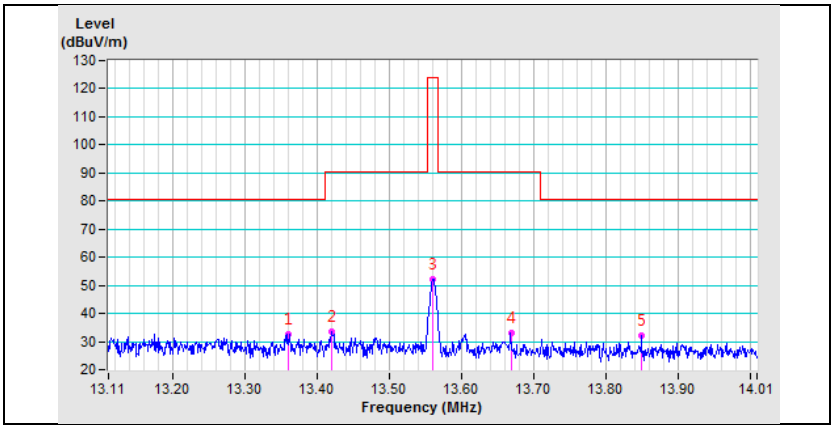
Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.36	32.7 QP	80.5	-47.8	1.00	195	36.0	-3.3
2	13.42	33.4 QP	90.5	-57.1	1.00	195	36.7	-3.3
3	*13.56	52.1 QP			1.00	195	55.4	-3.3
4	13.67	33.2 QP	90.5	-57.3	1.00	195	36.5	-3.3
5	13.85	32.1 QP	80.5	-48.4	1.00	195	35.5	-3.4

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:

13.56MHz = 15848uV/m 30m
= 84dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124dBuV/m



Frequency Range	13.110 ~ 14.010MHz	Detector Function	Quasi-Peak

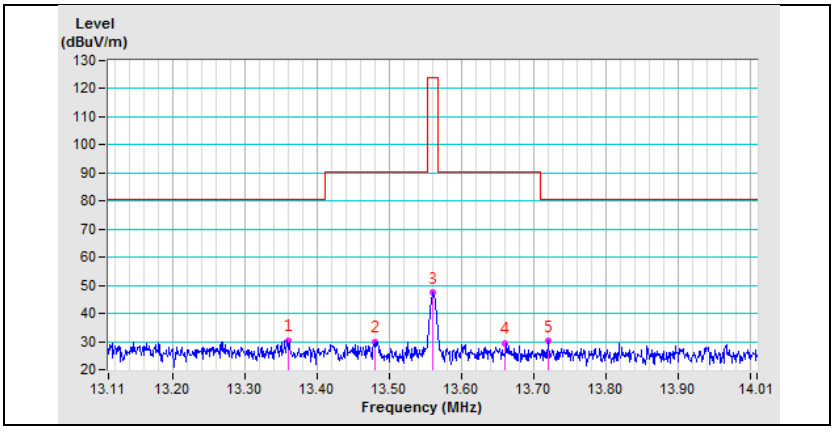
Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.36	30.4 QP	80.5	-50.1	1.00	115	33.7	-3.3
2	13.48	29.9 QP	90.5	-60.5	1.00	115	33.2	-3.3
3	*13.56	47.3 QP			1.00	115	50.6	-3.3
4	13.66	29.5 QP	90.5	-61.0	1.00	115	32.8	-3.3
5	13.72	30.1 QP	80.5	-50.4	1.00	115	33.5	-3.4

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:

13.56MHz = 15848uV/m 30m
= 84dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124dBuV/m



Frequency Range	Below 30MHz	Detector Function	Quasi-Peak

Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	1.94	29.0 QP	69.5	-40.5	1.00	12	30.0	-1.0
2	3.94	27.8 QP	69.5	-41.8	1.00	78	30.7	-2.9
3	12.75	32.5 QP	69.5	-37.0	1.00	87	35.7	-3.2
4	20.99	35.4 QP	69.5	-34.1	1.00	65	39.5	-4.2
5	22.69	38.7 QP	69.5	-30.8	1.00	236	42.5	-3.8
6	26.10	36.1 QP	69.5	-33.4	1.00	45	39.1	-3.0
Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	0.76	27.5 QP	70.0	-42.5	1.00	123	24.9	2.6
2	10.06	24.0 QP	69.5	-45.5	1.00	255	26.8	-2.8
3	11.80	27.0 QP	69.5	-42.5	1.00	120	30.1	-3.1
4	12.51	27.2 QP	69.5	-42.3	1.00	322	30.3	-3.2
5	20.99	33.1 QP	69.5	-36.4	1.00	45	37.3	-4.2
6	23.48	36.0 QP	69.5	-33.5	1.00	87	39.6	-3.6

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 ~ 1000MHz	Detector Function	Quasi-Peak

Antenna Polarity & Test Distance: Horizontal At 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	35.89	23.7 PK	40.0	-16.3	2.00 H	86	32.4	-8.7
2	147.69	22.7 PK	43.5	-20.8	1.00 H	300	30.7	-8.0
3	289.91	22.6 PK	46.0	-23.4	1.50 H	252	30.3	-7.7
4	403.50	25.4 PK	46.0	-20.6	1.00 H	360	30.3	-4.9
5	516.26	27.0 PK	46.0	-19.0	2.00 H	246	29.4	-2.4
6	736.01	30.9 PK	46.0	-15.1	1.00 H	112	29.3	1.6
Antenna Polarity & Test Distance: Vertical At 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	49.59	24.8 PK	40.0	-15.2	2.00 V	150	32.7	-7.9
2	143.00	22.6 PK	43.5	-20.9	3.00 V	221	30.8	-8.2
3	315.01	23.7 PK	46.0	-22.3	2.00 V	275	30.4	-6.7
4	427.46	27.4 PK	46.0	-18.6	2.00 V	179	31.4	-4.0
5	558.48	28.7 PK	46.0	-17.3	3.00 V	155	30.3	-1.6
6	716.54	31.2 PK	46.0	-14.8	3.00 V	240	30.4	0.8

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	13.110 ~ 14.010MHz	Detector Function	Quasi-Peak

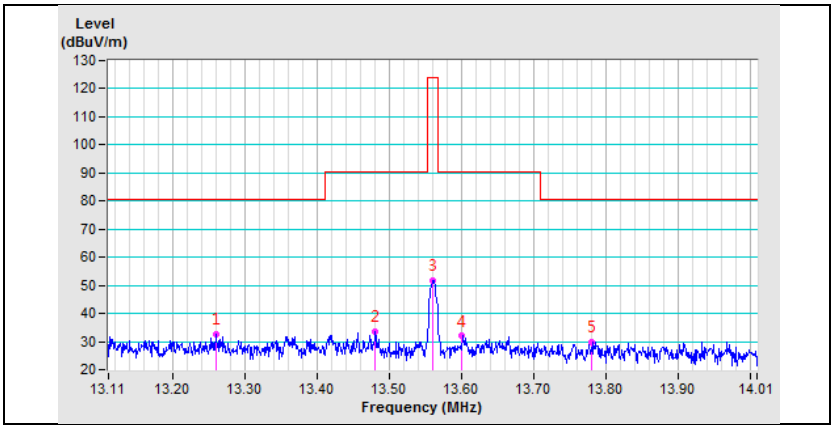
Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.26	32.7 QP	80.5	-47.8	1.00	209	36.0	-3.3
2	13.48	33.4 QP	90.5	-57.0	1.00	209	36.8	-3.3
3	*13.56	51.9 QP			1.00	209	55.2	-3.3
4	13.60	32.0 QP	90.5	-58.5	1.00	209	35.3	-3.3
5	13.78	29.9 QP	80.5	-50.6	1.00	209	33.3	-3.4

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:

13.56MHz = 15848uV/m 30m
= 84dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124dBuV/m



Frequency Range	13.110 ~ 14.010MHz	Detector Function	Quasi-Peak

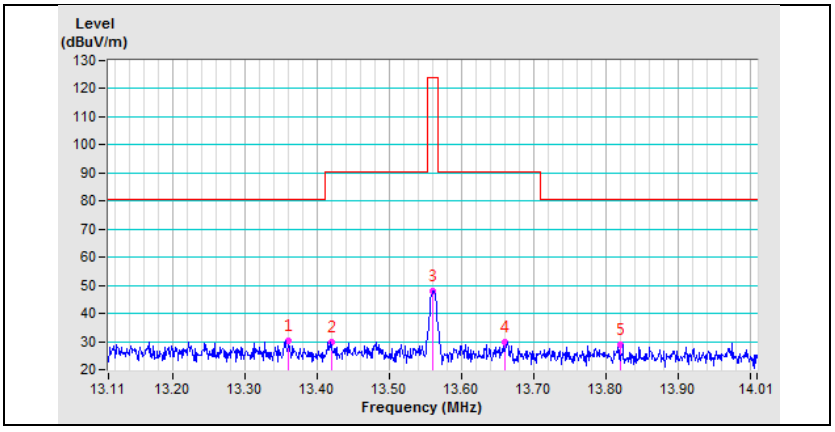
Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.36	30.3 QP	80.5	-50.2	1.00	94	33.6	-3.3
2	13.42	30.0 QP	90.5	-60.5	1.00	94	33.3	-3.3
3	*13.56	48.2 QP			1.00	94	51.5	-3.3
4	13.66	30.0 QP	90.5	-60.5	1.00	94	33.4	-3.3
5	13.82	29.0 QP	80.5	-51.5	1.00	94	32.3	-3.4

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:

13.56MHz = 15848uV/m 30m
= 84dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124dBuV/m



Frequency Range	Below 30MHz	Detector Function	Quasi-Peak

Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	0.60	29.5 QP	72.0	-42.5	1.00	209	25.6	3.9
2	3.95	27.2 QP	69.5	-42.3	1.00	360	30.2	-2.9
3	8.43	29.6 QP	69.5	-39.9	1.00	99	32.5	-2.9
4	20.17	31.9 QP	69.5	-37.6	1.00	47	36.2	-4.4
5	22.68	38.9 QP	69.5	-30.6	1.00	75	42.7	-3.8
6	25.96	35.8 QP	69.5	-33.7	1.00	123	38.8	-3.0
Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	0.76	29.4 QP	70.0	-40.6	1.00	21	26.8	2.6
2	10.02	24.3 QP	69.5	-45.2	1.00	45	27.2	-2.8
3	12.49	26.4 QP	69.5	-43.1	1.00	322	29.6	-3.2
4	18.24	26.3 QP	69.5	-43.2	1.00	222	30.4	-4.1
5	21.66	35.4 QP	69.5	-34.1	1.00	145	39.4	-4.0
6	26.10	36.5 QP	69.5	-33.0	1.00	211	39.5	-3.0

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 ~ 1000MHz	Detector Function	Quasi-Peak

Antenna Polarity & Test Distance: Horizontal At 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	65.48	22.6 PK	40.0	-17.4	2.00 H	360	31.9	-9.3
2	199.60	21.6 PK	43.5	-21.9	2.00 H	45	32.9	-11.3
3	392.95	24.7 PK	46.0	-21.3	1.00 H	360	29.9	-5.2
4	480.32	26.9 PK	46.0	-19.1	1.00 H	70	30.1	-3.2
5	694.86	31.0 PK	46.0	-15.0	1.50 H	290	30.2	0.8
6	962.87	34.4 PK	54.0	-19.6	1.00 H	190	30.1	4.3
Antenna Polarity & Test Distance: Vertical At 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	66.40	22.1 PK	40.0	-17.9	2.00 V	92	31.5	-9.4
2	145.33	22.3 PK	43.5	-21.2	1.00 V	306	30.4	-8.1
3	305.12	23.4 PK	46.0	-22.6	1.00 V	71	30.5	-7.1
4	426.85	26.5 PK	46.0	-19.5	2.00 V	91	30.6	-4.1
5	538.18	27.2 PK	46.0	-18.8	3.00 V	216	29.3	-2.1
6	617.67	29.7 PK	46.0	-16.3	2.00 V	247	29.9	-0.2

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 V(ISO15693)

Frequency Range	13.110 ~ 14.010MHz	Detector Function	Quasi-Peak

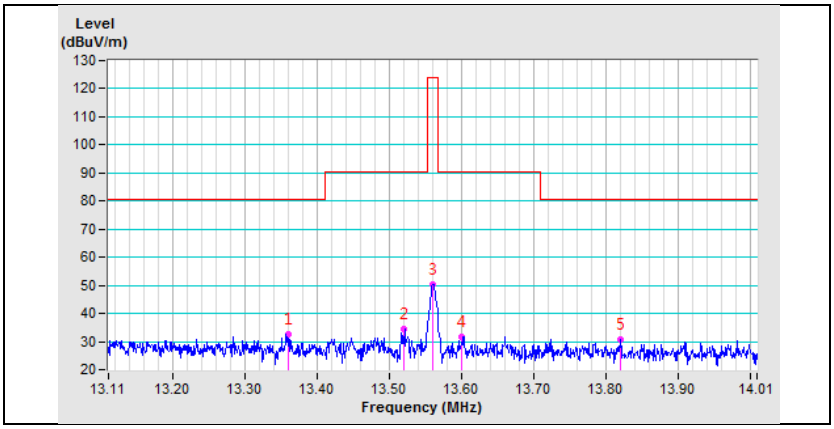
Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.36	32.6 QP	80.5	-47.9	1.00	207	35.9	-3.3
2	13.52	34.6 QP	90.5	-55.9	1.00	207	37.9	-3.3
3	*13.56	50.4 QP			1.00	207	53.7	-3.3
4	13.60	31.8 QP	90.5	-58.6	1.00	207	35.2	-3.3
5	13.82	30.9 QP	80.5	-49.6	1.00	207	34.3	-3.4

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:

13.56MHz = 15848uV/m 30m
= 84dBuV/m 30m
= $84+20\log(30/3)^2$ 3m
= 124dBuV/m



Frequency Range	13.110 ~ 14.010MHz	Detector Function	Quasi-Peak

Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	13.36	30.3 QP	80.5	-50.2	1.00	132	33.6	-3.3
2	13.42	31.9 QP	90.5	-58.6	1.00	132	35.2	-3.3
3	*13.56	46.3 QP			1.00	132	49.6	-3.3
4	13.60	30.6 QP	90.5	-59.8	1.00	132	34.0	-3.3
5	13.72	29.8 QP	80.5	-50.7	1.00	132	33.2	-3.4

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:

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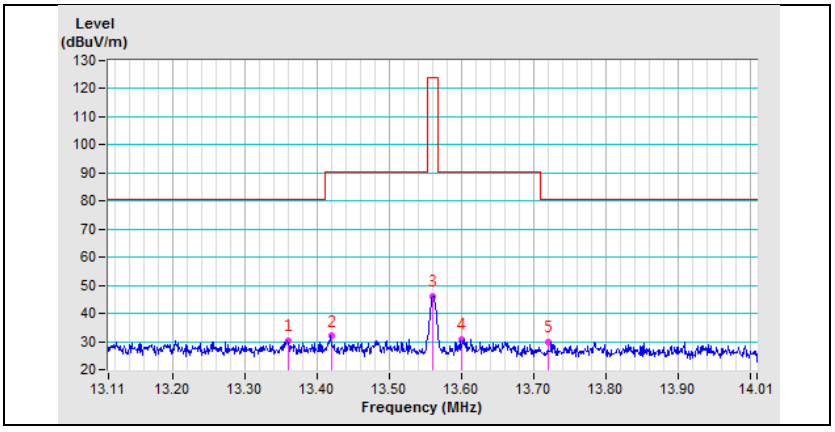


Frequency Range	Below 30MHz	Detector Function	Quasi-Peak

Antenna Polarity & Test Distance: Loop Antenna Open At 3m								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2.89	27.3 QP	69.5	-42.2	1.00	25	30.0	-2.7
2	11.46	28.3 QP	69.5	-41.2	1.00	54	31.4	-3.0
3	13.16	30.4 QP	69.5	-39.1	1.00	63	33.7	-3.3
4	18.24	28.7 QP	69.5	-40.8	1.00	360	32.8	-4.1
5	22.01	36.7 QP	69.5	-32.8	1.00	120	40.6	-3.9
6	23.13	38.8 QP	69.5	-30.7	1.00	78	42.5	-3.7
Antenna Polarity & Test Distance: Loop Antenna Close At 3m								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	0.82	27.3 QP	69.3	-42.1	1.00	122	25.2	2.1
2	8.43	26.1 QP	69.5	-43.4	1.00	360	29.0	-2.9
3	14.54	28.4 QP	69.5	-41.1	1.00	211	31.8	-3.5
4	20.26	28.7 QP	69.5	-40.8	1.00	45	33.0	-4.3
5	22.69	34.7 QP	69.5	-34.8	1.00	54	38.5	-3.8
6	25.38	35.5 QP	69.5	-34.1	1.00	122	38.6	-3.1

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 ~ 1000MHz	Detector Function	Quasi-Peak

Antenna Polarity & Test Distance: Horizontal At 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	59.71	24.1 PK	40.0	-15.9	1.00 H	77	32.4	-8.3
2	128.50	21.8 PK	43.5	-21.7	1.00 H	342	31.2	-9.4
3	345.18	24.1 PK	46.0	-21.9	2.00 H	82	30.3	-6.2
4	447.27	26.8 PK	46.0	-19.2	1.00 H	229	30.3	-3.5
5	591.14	29.3 PK	46.0	-16.7	1.00 H	360	30.0	-0.7
6	734.61	31.9 PK	46.0	-14.1	2.00 H	301	30.4	1.5
Antenna Polarity & Test Distance: Vertical At 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	36.30	24.6 PK	40.0	-15.4	1.00 V	360	33.3	-8.7
2	136.14	23.3 PK	43.5	-20.2	1.50 V	322	31.9	-8.6
3	370.49	24.8 PK	46.0	-21.2	2.00 V	110	30.5	-5.7
4	491.60	26.9 PK	46.0	-19.1	1.50 V	27	29.9	-3.0
5	607.49	29.6 PK	46.0	-16.4	1.50 V	19	30.0	-0.4
6	696.39	30.1 PK	46.0	-15.9	2.00 V	259	29.3	0.8

REMARKS:

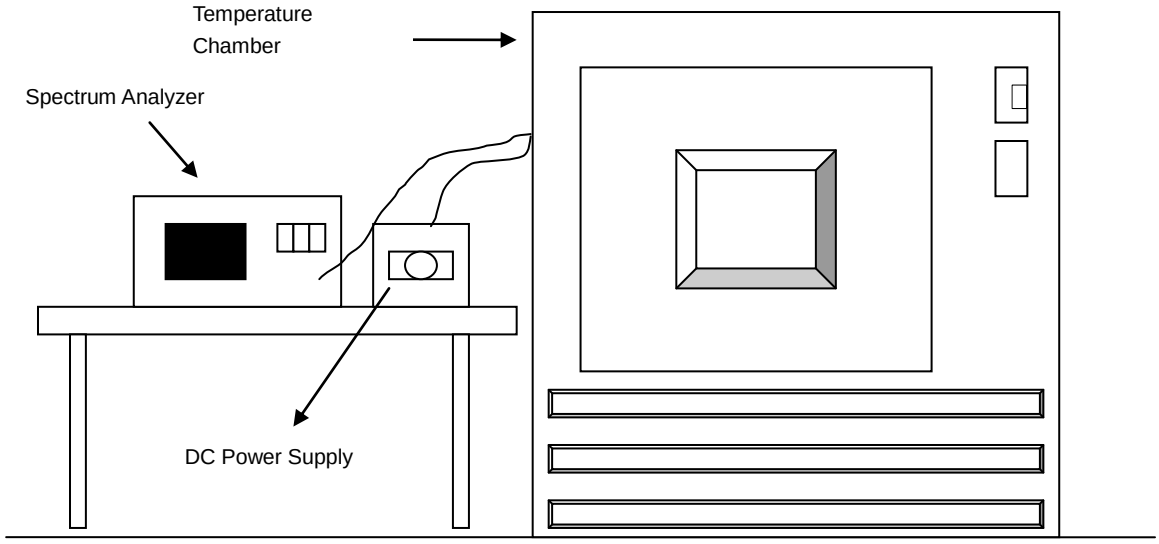
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Frequency Stability

4.2.1 Limits of Frequency Stability Measurement

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

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.

b. Turned the EUT on and coupled its output to a spectrum analyzer.

c. Turned the EUT off and set the chamber to the highest temperature specified.

d. Allowed sufficient time (approximately 30 min) for the temperature of the chamber to stabilize then turned the EUT on and measured the operating frequency after 2, 5, and 10 minutes.

e. Repeated step 2 and 3 with the temperature chamber set to the lowest temperature.

f. 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.

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

Same as Item 4.1.6.

4.2.7 Test Result

Frequemcy Stability Versus Temp.									
TEMP. (℃)	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)	%
50	3.85	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029
40	3.85	13.56003	0.00022	13.56004	0.00029	13.56003	0.00022	13.56003	0.00022
30	3.85	13.55996	-0.00029	13.55998	-0.00015	13.55997	-0.00022	13.55997	-0.00022
20	3.85	13.55999	-0.00007	13.55998	-0.00015	13.56	0.00000	13.55999	-0.00007
10	3.85	13.55998	-0.00015	13.55998	-0.00015	13.55999	-0.00007	13.55999	-0.00007
0	3.85	13.55996	-0.00029	13.55996	-0.00029	13.55996	-0.00029	13.55995	-0.00037
-10	3.85	13.55995	-0.00037	13.55995	-0.00037	13.55995	-0.00037	13.55995	-0.00037
-20	3.85	13.56004	0.00029	13.56003	0.00022	13.56003	0.00022	13.56003	0.00022

Frequemcy Stability Versus Voltage									
TEMP. (℃)	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	13.55999	-0.00007	13.55998	-0.00015	13.56	0.00000	13.55999	-0.00007
	3.85	13.55999	-0.00007	13.55998	-0.00015	13.56	0.00000	13.55999	-0.00007
	3.27	13.55999	-0.00007	13.55998	-0.00015	13.56	0.00000	13.55999	-0.00007

4.3 20dB bandwidth

4.3.1 Limits of 20dB Bandwidth Measurement

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

4.3.2 Test Setup

Same as Item 4.1.5.

4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 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.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

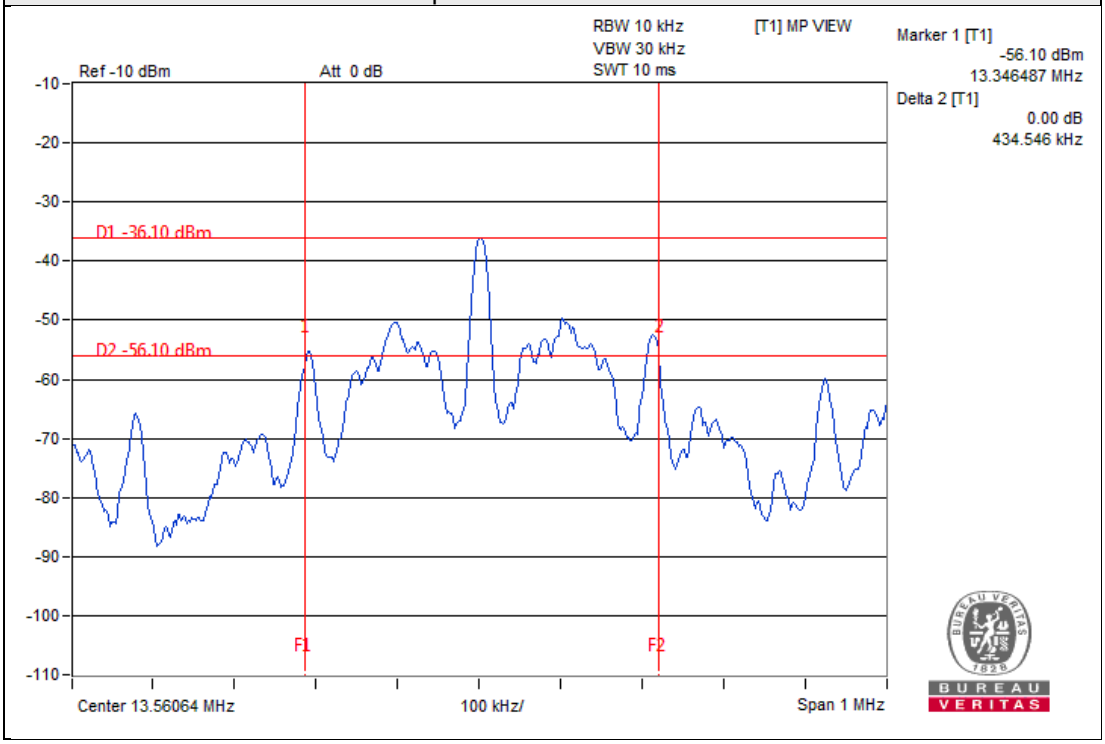
Same as Item 4.1.6.

4.3.7 Test Results

Type A

20dBc point (Low)	20dBc point (High)	Operating frequency band (MHz)	Pass/Fail
13.346487	13.781033	13.11 – 14.01	PASS

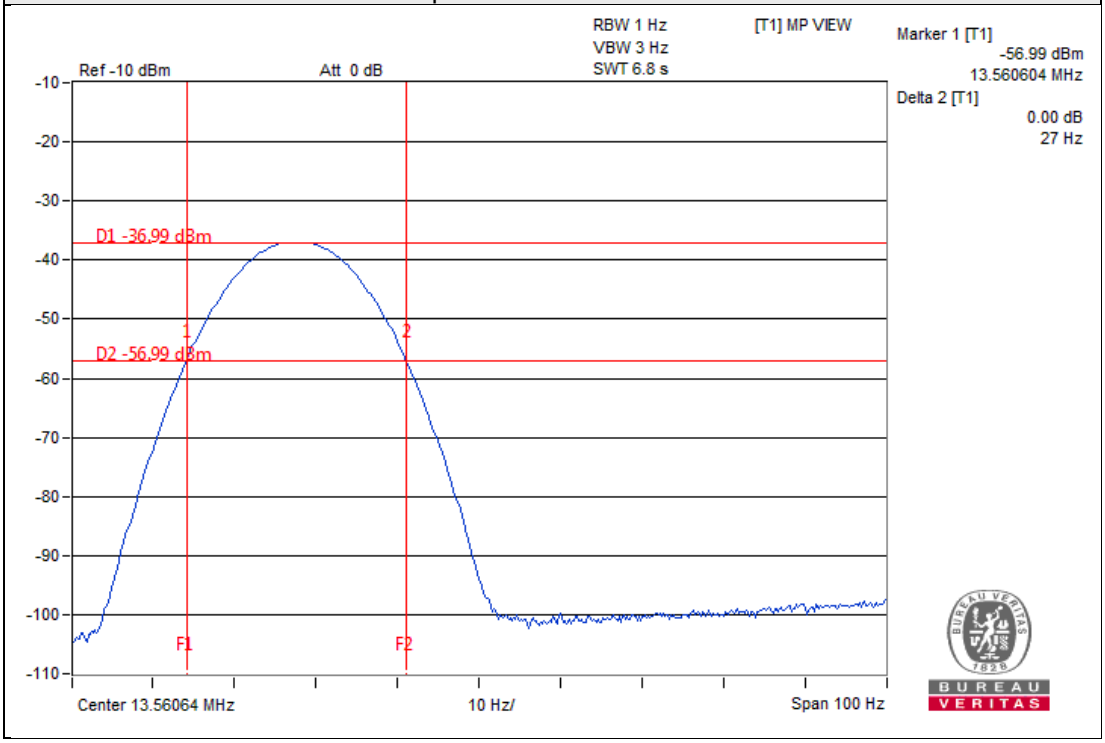
Spectrum Plot Of Value



Type B

20dBc point (Low)	20dBc point (High)	Operating frequency band (MHz)	Pass/Fail
13.560604	13.560631	13.11 – 14.01	PASS

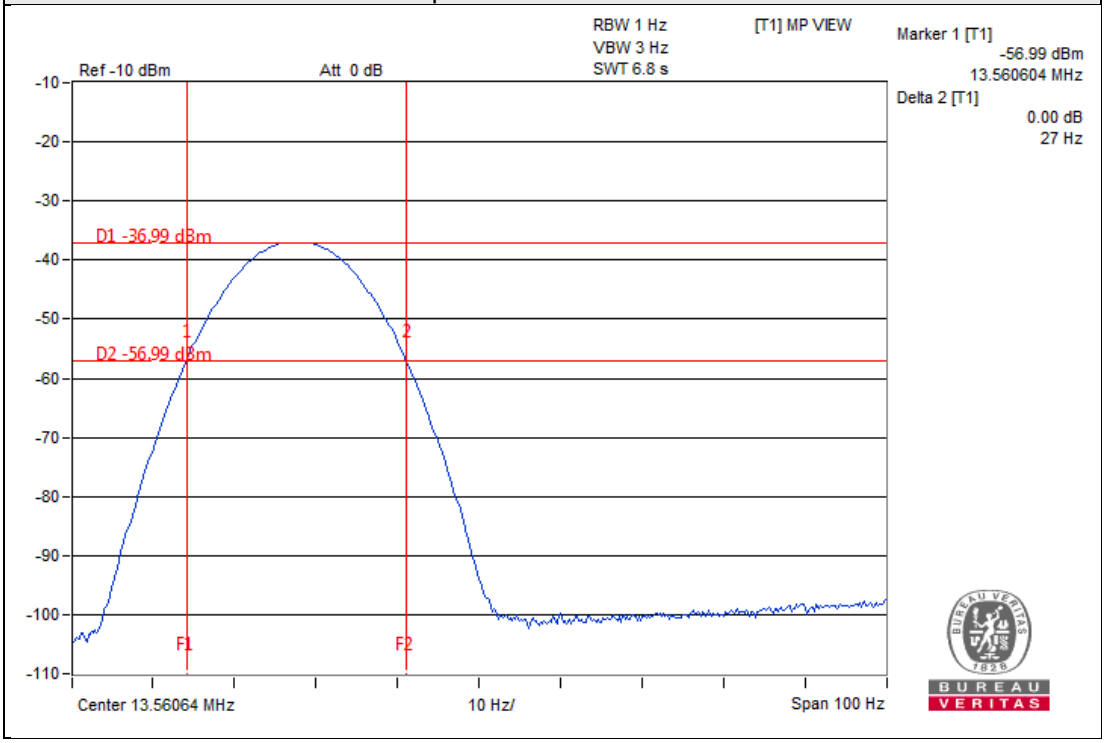
Spectrum Plot Of Value



Type F

20dBc point (Low)	20dBc point (High)	Operating frequency band (MHz)	Pass/Fail
13.560604	13.560631	13.11 – 14.01	PASS

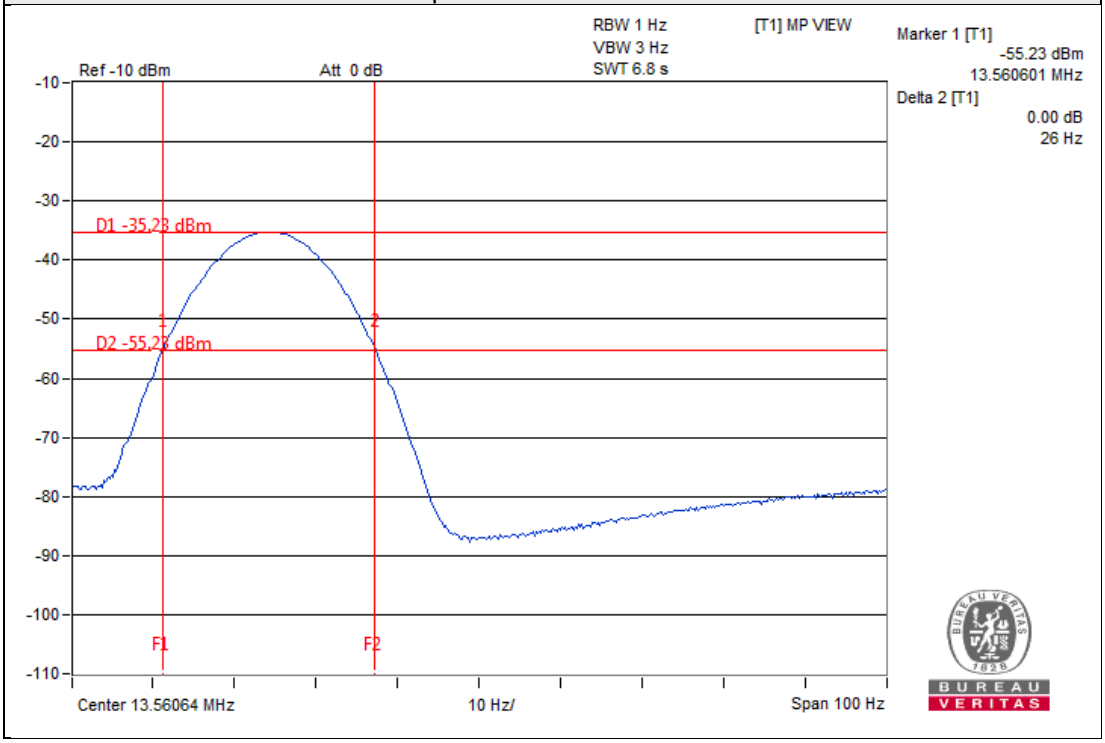
Spectrum Plot Of Value



Type V(ISO15693)

20dBc point (Low)	20dBc point (High)	Operating frequency band (MHz)	Pass/Fail
13.560601	13.560627	13.11 – 14.01	PASS

Spectrum Plot Of Value



5 Pictures of Test Arrangements

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

Appendix – Information on 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:

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

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