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# RADIO TEST REPORT

Report No.: STS2103022W01

Issued for

Shenzhen ChangTaiWei Electronic CO.,LTD

5/F.,6 Block, XinGu Industrial Zone, GuShu Village, XiXiang  
Town, BaoAn District, Shenzhen City, China

<b>Product Name:</b>	WalkieTalkie, FRS
<b>Brand Name:</b>	N/A
<b>Model Name:</b>	T-388
<b>Series Model:</b>	N/A
<b>FCC ID:</b>	2ACVFT-388
<b>Test Standard:</b>	FCC Part 95

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TEST REPORT CERTIFICATION

Applicant's Name.....: Shenzhen ChangTaiWei Electronic CO.,LTD
Address .....: 5/F.,6 Block, XinGu Industrial Zone, GuShu Village, XiXiang Town, BaoAn District, Shenzhen City, China
Manufacturer's Name.....: Shenzhen ChangTaiWei Electronic CO.,LTD
Address .....: 5/F.,6 Block, XinGu Industrial Zone, GuShu Village, XiXiang Town, BaoAn District, Shenzhen City, China

Product Description

Product Name.....: WalkieTalkie, FRS
Brand Name .....: N/A
Model Name .....: T-388
Series Model.....: N/A

Test Standards.....: FCC Part 95

Test Procedure .....: TIA 603-E

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test .....:
Date of receipt of test item .....: 03 Mar. 2021
Date of performance of tests.....: 03 Mar. 2021 ~ 15 Mar. 2021
Date of Issue .....: 15 Mar. 2021
Test Result.....: Pass

Testing Engineer : [Signature]
(Chris chen)

Technical Manager : [Signature]
(Sean she)

Authorized Signatory : [Signature]
(Vita Li)





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### Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	15 Mar. 2021	STS2103022W01	ALL	Initial Issue





## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part 95			
Standard Section	Test Item	Judgment	Remark
FCC Part 95.567	Transmitter Output Power and Effective Radiated Power (e.r.p)	PASS	--
FCC Part 95.573	Authorized Bandwidth	PASS	--
FCC Part 95.579	Emission Mask	PASS	--
FCC Part 95.579	Transmitter Radiated Spurious Emission	PASS	--
FCC Part 95.579	Spurious Emission On Antenna Port	PASS	--
FCC Part 95.565	Frequency Stability	PASS	--
FCC Part 95.575	Audio Frequency Filter	PASS	--
FCC Part 95.575	Modulation Requirements	PASS	--
FCC Part 15.207	AC power-line Conducted Emission	N/A	--

NOTE: (1) "N/A" denotes test is not applicable in this Test Report.

(2) All tests are according to TIA 603-E.



## 1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.68\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.988\text{dB}$
3	All emissions, radiated 9K-30MHz	$\pm 2.68\text{dB}$
4	All emissions, radiated 30M-1GHz	$\pm 5.6\text{dB}$
5	All emissions, radiated 1G-6GHz	$\pm 5.5\text{dB}$
6	All emissions, radiated >6G	$\pm 5.8\text{dB}$
7	Conducted Emission (9KHz-150KHz)	$\pm 3.37\text{dB}$
8	Conducted Emission (150KHz-30MHz)	$\pm 3.83\text{dB}$



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	WalkieTalkie, FRS	
Brand Name	N/A	
Model Name	T-388	
Series Model	N/A	
Model Difference	N/A	
Operation Frequency Range:	462.5625MHz-467.7125MHz Please refer to the note 3	
Modulation Type	FRS	F3E
Emission types	FRS	6K29F3E
Power Rating	Input: DC 6V from battery	
Hardware version number	N/A	
Software version number	N/A	
Connecting I/O Port(s)	Please refer to the note 1	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.

2. Table for filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	T-388	Spring antenna	N/A	0	Antenna





## 3. Channel List

Channel	Frequency(MHz)	Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	462.5625	9	467.5875	17	462.6000
2	462.5875	10	467.6125	18	462.6250
3	462.6125	11	467.6375	19	462.6500
4	462.6375	12	467.6625	20	462.6750
5	462.6625	13	467.6875	21	462.7000
6	462.6875	14	467.7125	22	462.7250
7	462.7125	15	462.5500		
8	467.5625	16	462.5750		

Test channel:

Channel	Frequency(MHz)
1	462.5625
11	467.6375
22	462.7250



## 2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

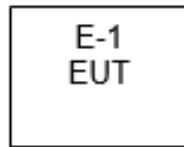
Pretest Mode	Description
Mode 1	FRS CH01 TX Mode
Mode 2	FRS CH11 TX Mode
Mode 3	FRS CH22 TX Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	FRS CH01 TX Mode
Mode 2	FRS CH11 TX Mode
Mode 3	FRS CH22 TX Mode



## 2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

### Radiated Spurious Emission Test



## 2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND 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.

### Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
N/A	N/A	N/A	N/A	N/A	N/A

### Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
N/A	N/A	N/A	N/A	N/A	N/A

Note:

(1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



## 2.5 EQUIPMENTS LIST

## Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Bilog Antenna	TESEQ	CBL6111D	34678	2020.10.12	2021.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2019.10.15	2021.10.14
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2020.10.12	2021.10.11
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2020.10.12	2021.10.11
Signal Analyzer	R&S	FSV 40-N	101823	2020.10.10	2021.10.09
Temperature & Humidity	HH660	Mieo	N/A	2020.10.13	2021.10.12
Turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
AC Power Source	APC	KDF-11010G	F214050035	N.C.R	N.C.R
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			

## RF Connected Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Signal Generator	Agilent	N5182A	MY46240556	2020.10.10	2021.10.09
Signal Analyzer	Agilent	N9020A	MY51110105	2021.03.04	2022.03.03
Universal Radio communication tester	R&S	CMU200	119907	2020.10.12	2021.10.11
Audio analyzer	R&S	UPL	N/A	2021.03.04	2022.03.03
Intercom comprehensive tester	HP	8920A	348A05658	2021.03.04	2022.03.03
Temperature & Humidity	HH660	Mieo	N/A	2020.10.13	2021.10.12
Temperature & Humidity test chamber	Safety test	AG80L	171200018	2021.03.04	2022.03.03
Programmable power supply	Agilent	E3642A	MY40002025	2020.10.12	2021.10.11
Attenuator	HP	8494B	DC-18G	2020.04.30	2021.04.29
AC Power Source	APC	KDF-11010G	F214050035	N.C.R	N.C.R
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			



### 3. FIELD STRENGTHS AND RADIATED SPURIOUS EMISSION

#### 3.1 RADIATED EMISSION LIMITS

In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below:

- (a) If the equipment operates below 10 GHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency, as well as to those frequencies removed from the carrier by multiples of the oscillator frequency.

Radiation at the frequencies of multiplier stages should also be checked.

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value need not be reported.

$43 + 10 \log (P_{\text{watts}})$

Calculation: Limit (dBm) = EL-43-10log<sub>10</sub> (TP)

Notes: EL is the emission level of the Output Power expressed in dBm,

In this application, the EL is P (dBm).

Limit (dBm) = P (dBm)-43-10 log (Pwatts) = -13 dBm

#### LIMITS OF RESTRICTED FREQUENCY BANDS

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			



Frequencies (MHz)	Field Strength (micorvolts/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

Spectrum Parameter	Setting
Detector	Peak
Attenuation	Auto
Start Frequency	30 MHz
Stop Frequency	10th carrier harmonic

### 3.2 TEST PROCEDURE

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0 m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz for above 1GHz and BW=100kHz, VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (Pr).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ( $P_{Mea}$ ) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source ( $P_{Mea}$ ) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.



5. An amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss ( $P_{cl}$ ), the Substitution Antenna Gain ( $G_a$ ) and the Amplifier Gain ( $P_{Ag}$ ) should be recorded after test. The measurement results are obtained as described below:

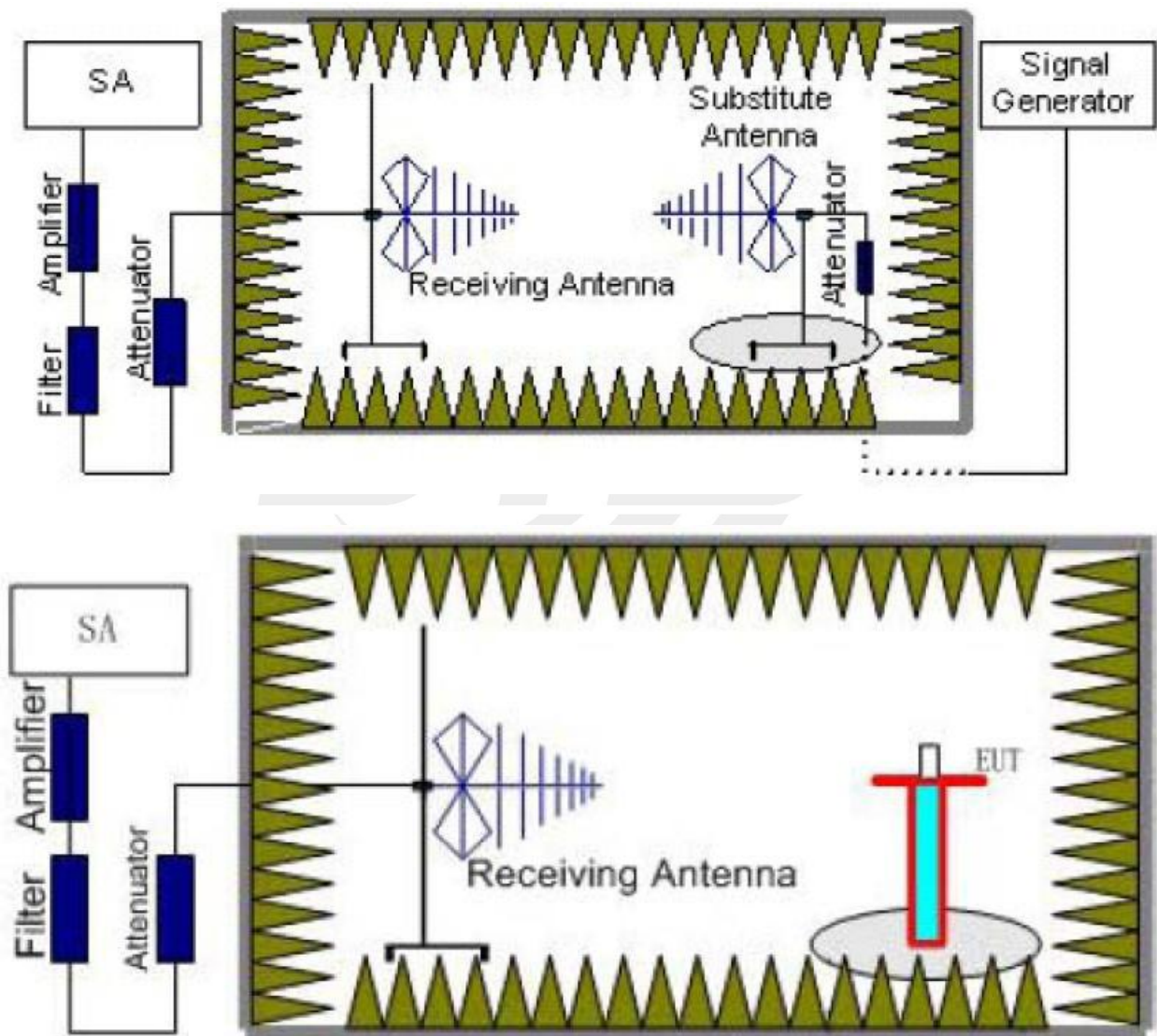
$$\text{Power(EIRP)} = P_{\text{Mea}} - P_{\text{Ag}} - P_{\text{cl}} + G_a$$

We used signal generator which signal level can up to 33dBm,so we not used power Amplifier for substitution test; The measurement results are amend as described below:

$$\text{Power(EIRP)} = P_{\text{Mea}} - P_{\text{cl}} + G_a$$

6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power
7. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$

### 3.3 TEST SETUP



### 3.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



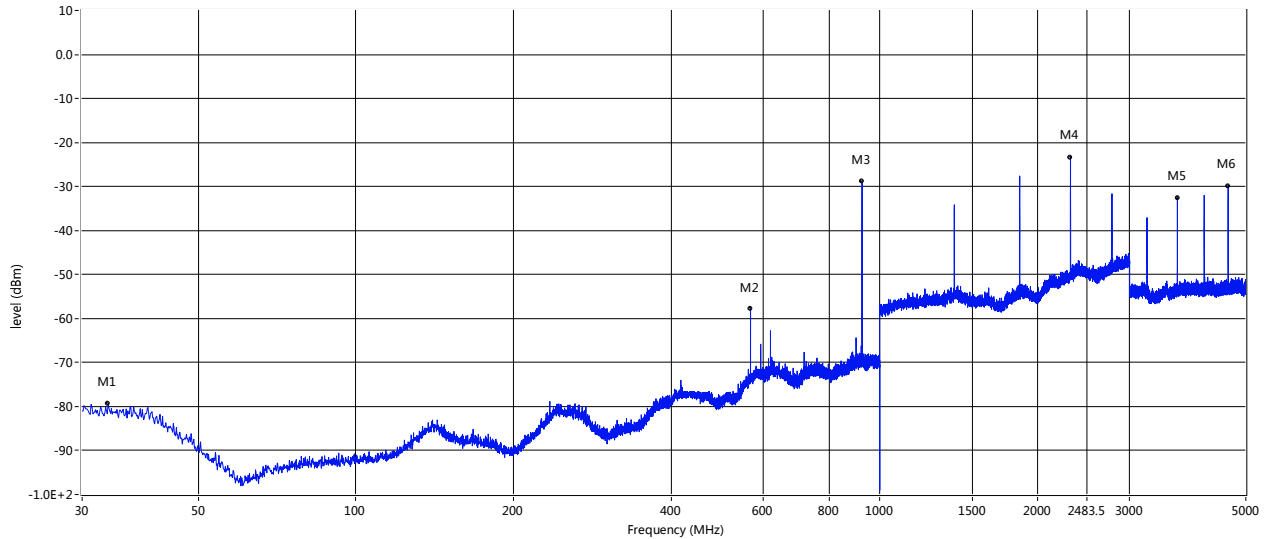
### 3.5 TEST RESULT

Note: 1. The unwanted emissions falling into the restricted frequency band limit is 82.2dBuV/m, whichever is less stringent. The spurious emission and restricted frequency band data are shown on the same graph.

2.  $E(\text{dBuV/m}) = E(\text{dBm}) + 95.2$ ,  $-13\text{dBm} + 95.2 = 82.2\text{dBuV/m}$ .

Temperature:	26.4 °C	Relative Humidity:	69%
Test Mode:	Mode 1	Phase :	Horizontal

RSE\_FCC Test Case\_FCC 95 30MHz-5GHz-H



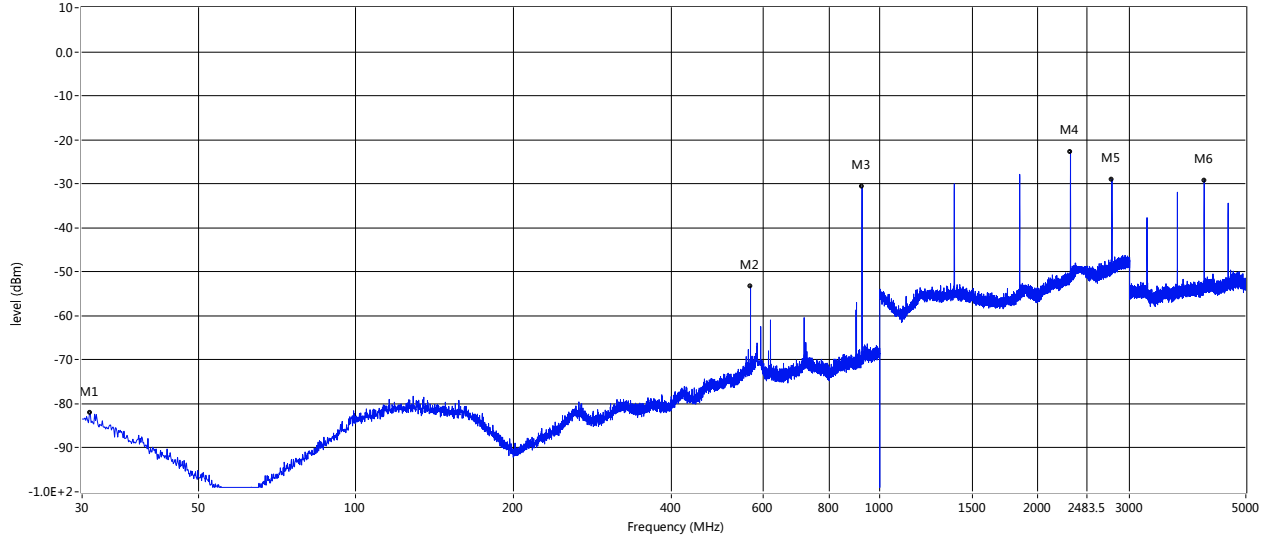
Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
33.638	-79.34	-1.89	-13.0	-66.34	45.70	Horizontal	Vertical	Pass
566.531	-57.80	5.59	-13.0	-44.80	277.90	Horizontal	Vertical	Pass
925.189	-28.88	9.23	-13.0	-15.88	318.40	Horizontal	Vertical	Pass
2313.000	-23.35	18.06	-13.0	-10.35	141.70	Horizontal	Vertical	Pass
3700.750	-32.55	3.66	-13.0	-19.55	101.40	Horizontal	Vertical	Pass
4626.000	-29.85	4.65	-13.0	-16.85	242.40	Horizontal	Vertical	Pass





Temperature:	26.4 °C	Relative Humidity:	69%
Test Mode:	Mode 1	Phase:	Vertical

RSE\_FCC Test Case\_FCC 95 30MHz-5GHz-V

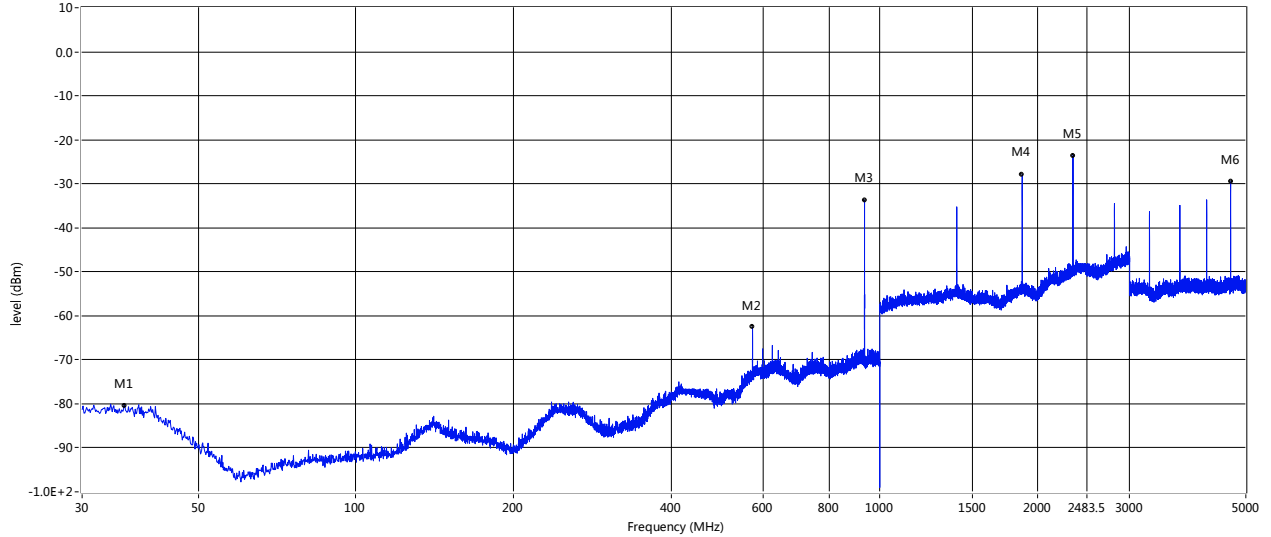


Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
31.091	-82.02	-4.38	-13.0	-69.02	107.70	Horizontal	Vertical	Pass
566.531	-53.32	6.14	-13.0	-40.32	6.60	Horizontal	Vertical	Pass
925.189	-30.68	9.27	-13.0	-17.68	60.10	Horizontal	Vertical	Pass
2313.000	-22.68	17.09	-13.0	-9.68	178.40	Horizontal	Vertical	Pass
2775.500	-29.00	19.31	-13.0	-16.00	5.00	Horizontal	Vertical	Pass
4163.250	-29.26	3.95	-13.0	-16.26	225.00	Horizontal	Vertical	Pass



Temperature:	26.4 °C	Relative Humidity:	69%
Test Mode:	Mode 2	Phase :	Horizontal

RSE\_FCC Test Case\_FCC 95 30MHz-5GHz-H

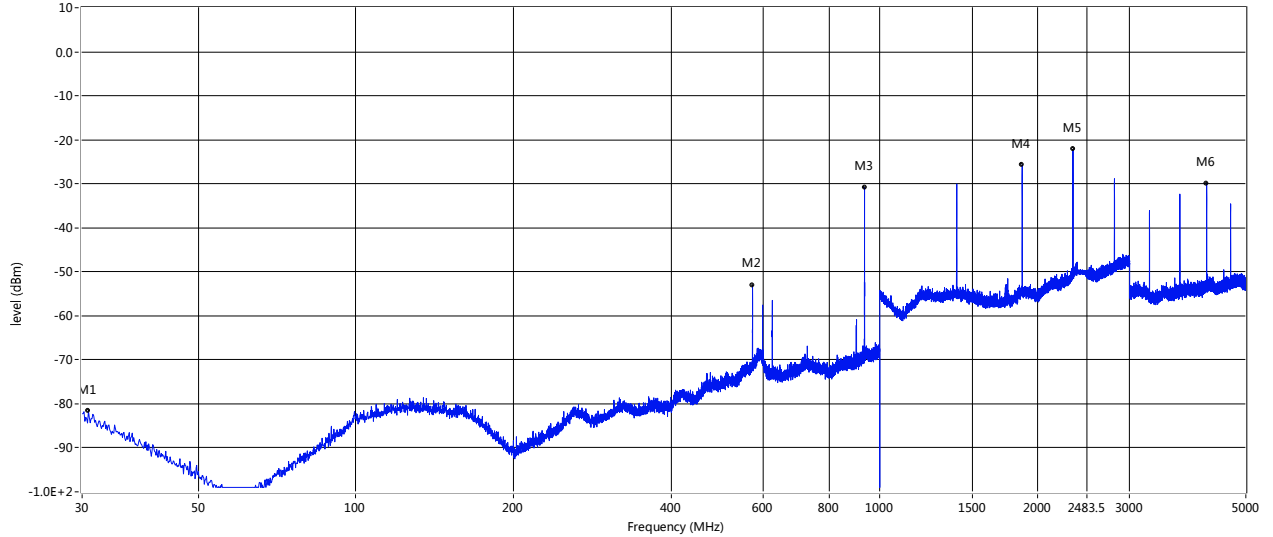


Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
36.184	-80.37	-1.87	-13.0	-67.37	117.80	Horizontal	Vertical	Pass
571.624	-62.56	6.01	-13.0	-49.56	271.40	Horizontal	Vertical	Pass
935.374	-33.70	8.52	-13.0	-20.70	319.10	Horizontal	Vertical	Pass
1870.500	-27.94	14.50	-13.0	-14.94	303.10	Horizontal	Vertical	Pass
2338.500	-23.57	18.63	-13.0	-10.57	163.90	Horizontal	Vertical	Pass
4676.750	-29.57	4.64	-13.0	-16.57	243.20	Horizontal	Vertical	Pass



Temperature:	26.4 °C	Relative Humidity:	69%
Test Mode:	Mode 2	Phase:	Vertical

RSE\_FCC Test Case\_FCC 95 30MHz-5GHz-V

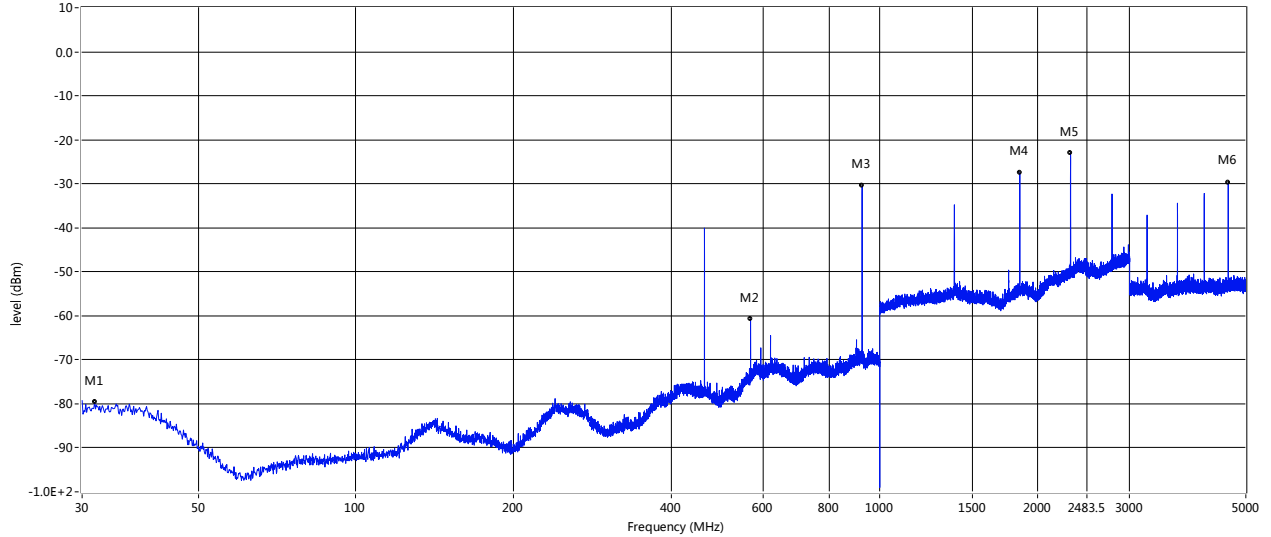


Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
30.849	-81.64	-4.22	-13.0	-68.64	251.20	Horizontal	Vertical	Pass
571.624	-53.14	5.91	-13.0	-40.14	359.90	Horizontal	Vertical	Pass
935.374	-30.89	9.89	-13.0	-17.89	332.70	Horizontal	Vertical	Pass
1870.750	-25.68	13.94	-13.0	-12.68	347.30	Horizontal	Vertical	Pass
2338.500	-22.20	17.98	-13.0	-9.20	204.40	Horizontal	Vertical	Pass
4208.750	-29.93	4.35	-13.0	-16.93	332.20	Horizontal	Vertical	Pass



Temperature:	26.4 °C	Relative Humidity:	69%
Test Mode:	Mode 3	Phase :	Horizontal

RSE\_FCC Test Case\_FCC 95 30MHz-5GHz-H

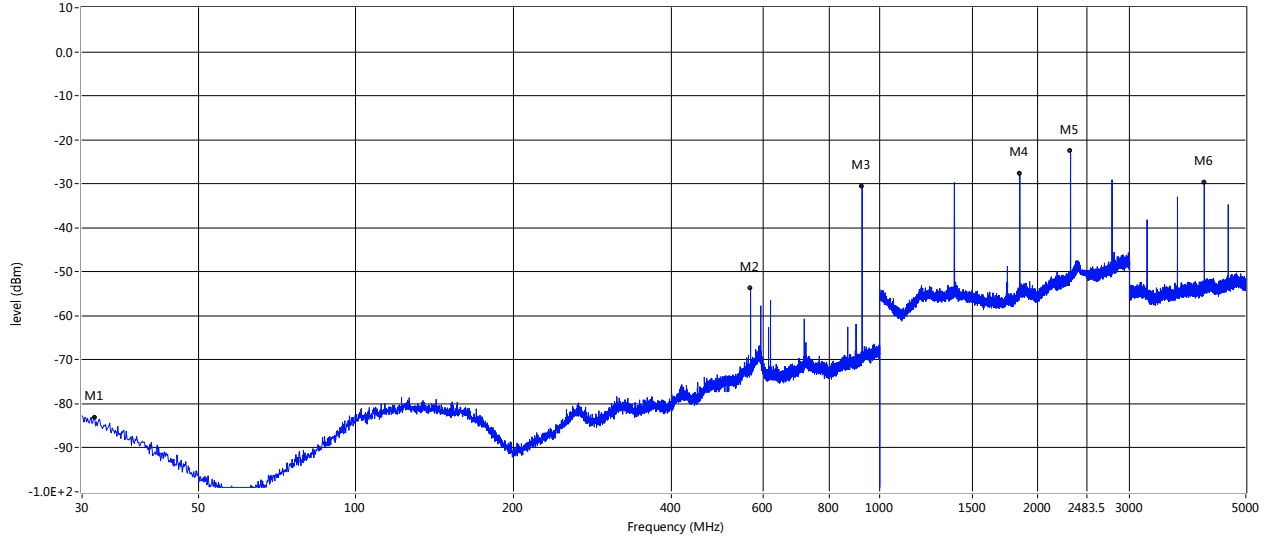


Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
31.698	-79.62	-1.90	-13.0	-66.62	82.40	Horizontal	Vertical	Pass
566.774	-60.72	5.61	-13.0	-47.72	272.90	Horizontal	Vertical	Pass
925.553	-30.44	9.21	-13.0	-17.44	320.50	Horizontal	Vertical	Pass
1851.000	-27.51	14.46	-13.0	-14.51	333.20	Horizontal	Vertical	Pass
2313.750	-23.03	18.08	-13.0	-10.03	144.20	Horizontal	Vertical	Pass
4627.500	-29.83	4.65	-13.0	-16.83	235.90	Horizontal	Vertical	Pass



Temperature:	26.4 °C	Relative Humidity:	69%
Test Mode:	Mode 3	Phase:	Vertical

RSE\_FCC Test Case\_FCC 95 30MHz-5GHz-V



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Over Limit (dB)	Table (o)	ANT	EUT	Verdict
31.698	-83.17	-4.77	-13.0	-70.17	106.60	Vertical	Vertical	Pass
566.774	-53.73	6.13	-13.0	-40.73	344.00	Vertical	Vertical	Pass
925.553	-30.55	9.29	-13.0	-17.55	88.70	Vertical	Vertical	Pass
1851.000	-28.26	13.67	-13.0	-15.26	0.30	Vertical	Vertical	Pass
2313.750	-22.51	17.11	-13.0	-9.51	184.40	Vertical	Vertical	Pass
4164.750	-29.81	3.96	-13.0	-16.81	234.60	Vertical	Vertical	Pass

### 4. SPURIOUS EMISSION ON ANTENNA PORT

#### 4.1 LIMIT

43 + 10 log (Pwatts)

Calculation: Limit (dBm) = EL-43-10log10 (TP)

Notes: EL is the emission level of the Output Power expressed in dBm,

In this application, the EL is P( dBm).

Limit (dBm) = P( dBm)-43-10 log (Pwatts) = -13 dBm

#### 4.2 TEST PROCEDURE

1. The EUT was connected to the spectrum analyzer through sufficient attenuation.
2. Sufficient scans were taken to show any out of band emission up to 10th. Harmonic for the lower and the highest frequency range.
3. Set EUT as digital data mode.
4. Set RBW 30kHz, VBW 100 kHz in the frequency band 30MHz to 1GHz, while set RBW=1MHz. VBW=3MHz from the 1GHz to 10th Harmonic.

#### 4.3 TEST SETUP

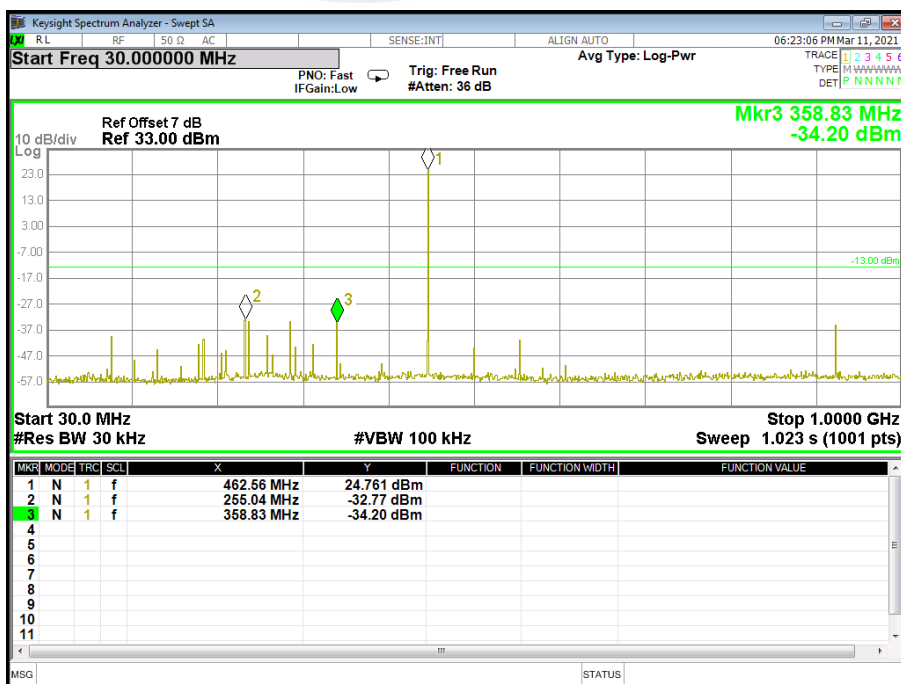


#### 4.4 EUT OPERATION CONDITIONS

TX mode.

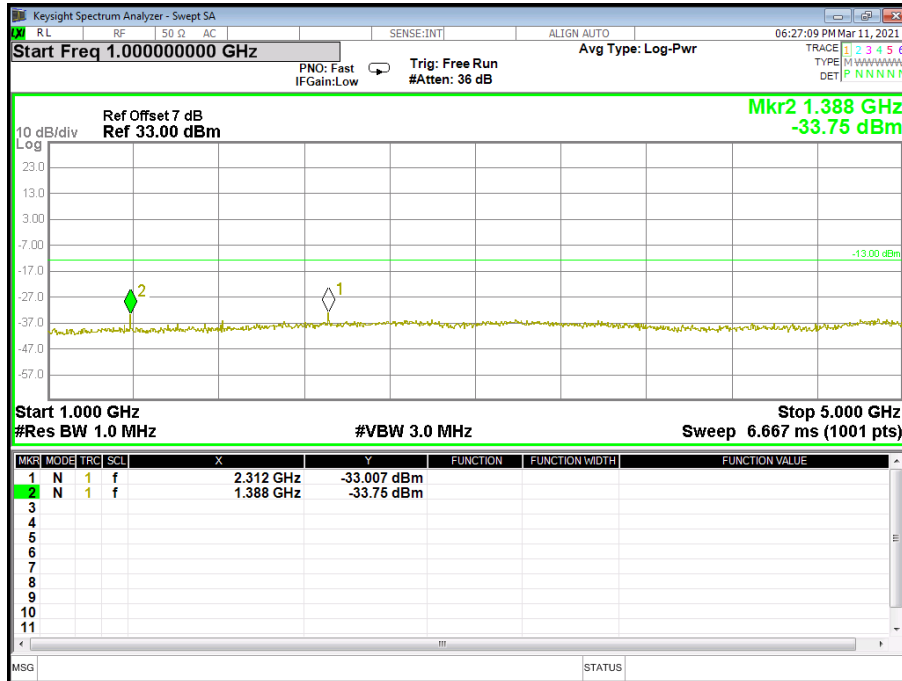
#### 4.5 TEST RESULT

Low channel(30MHz-1GHz)

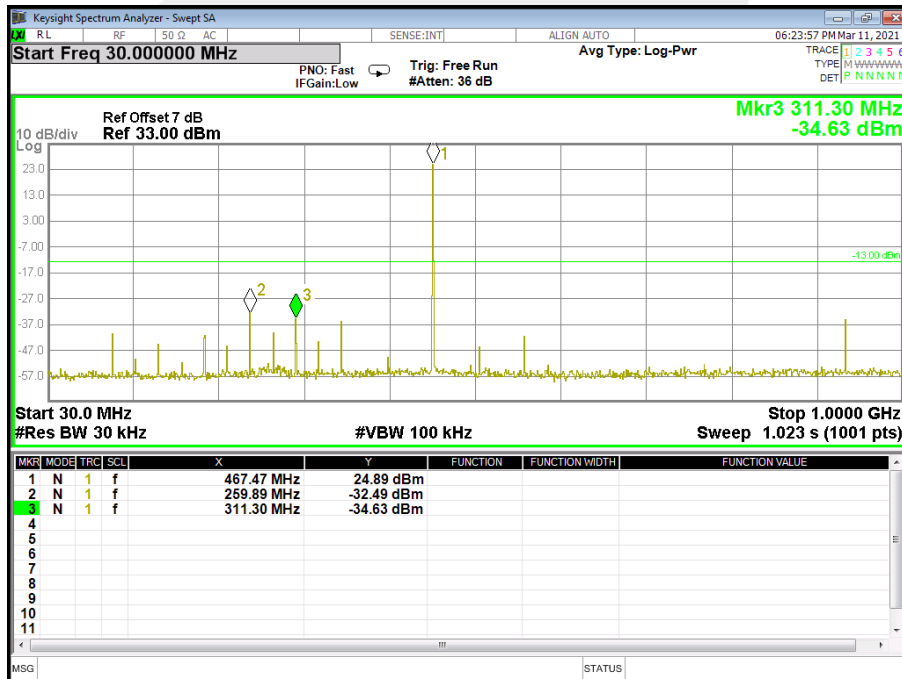




### Low channel(1GHz-5GHz)

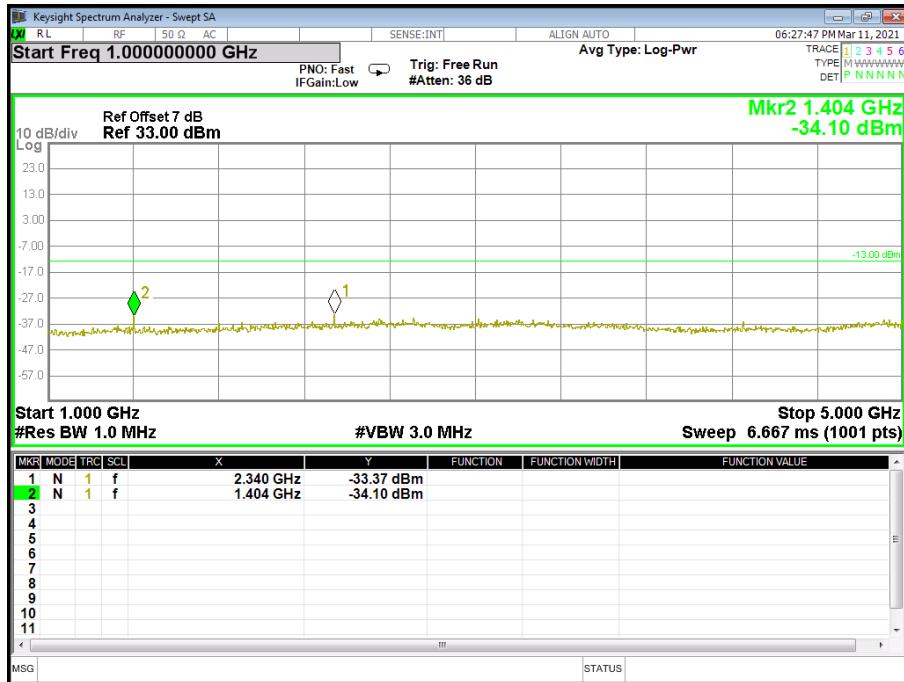


### Mid channel(30MHz-1GHz)

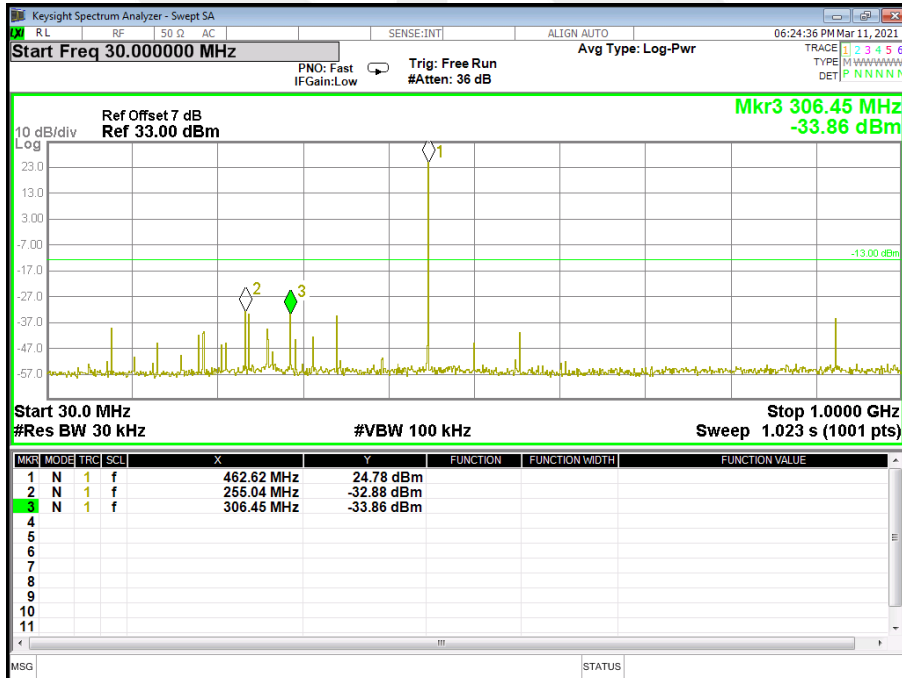




### Mid channel(1GHz-5GHz)



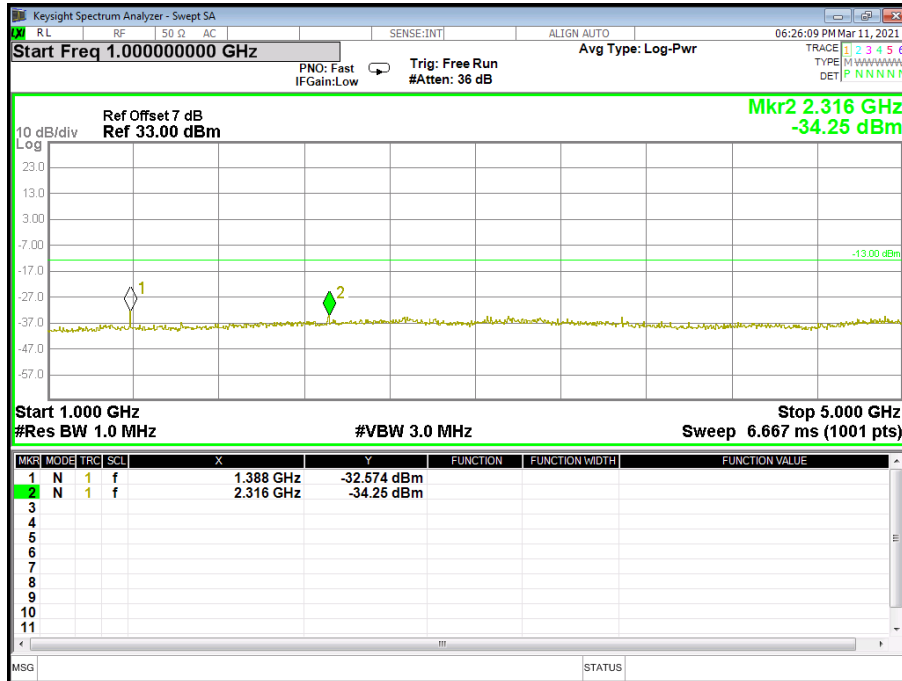
### High channel(30MHz-1GHz)







### High channel(1GHz-5GHz)



## 5. BANDWIDTH TEST

### 5.1 LIMIT

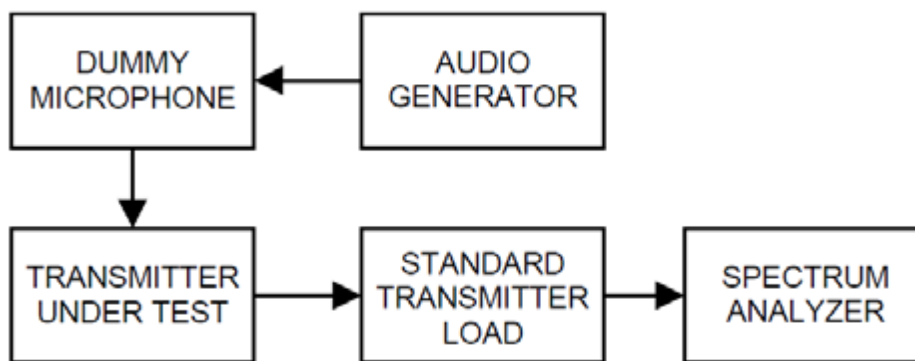
#### FRS:

The authorized bandwidth for an FRS unit is 12.5 kHz.

### 5.2 TEST PROCEDURE

1. The EUT was connected to the spectrum analyzer through sufficient attenuation.
2. Set EUT as digital data mode.
3. Set SPA Center Frequency=fundamental frequency, RBW=100Hz, VBW=1KHz, span =15KHz.
4. Set SPA Max hold. Mark peak, Set 99% Occupied Bandwidth.

### 5.3 TEST SETUP



### 5.4 EUT OPERATION CONDITIONS

TX mode.