FCC TEST REPORT

Report No:STS1805273W01

Issued for

Shenzhen nestling Technology Co. Ltd.

1A#521, BLDG 1A, RuiShangJu,Gushu Hangcheng Av., Xixiang St., Bao'an Dist. Shenzhen CHINA 518000

Product Name:	Walkie Talkie
Brand Name:	Nestling
Model Name:	888S
Series Model:	N/A
FCC ID:	2AP7D-888S
Test Standard:	FCC Part 90 Rules

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TEST RESULT CERTIFICATION

Applicant's name	Shenzhen nestling Technology Co. Ltd.
Address	1A#521, BLDG 1A, RuiShangJu,Gushu Hangcheng Av., Xixiang St., Bao'an Dist. Shenzhen CHINA 518000
Manufacture's Name	FUJIAN NAN'AN BAOFENG ELECTRONICS CO.,LTD.
Address	CHANGFU INDUSTRIAL ZONE,XIAMEI,NAN'AN,QUANZHOU. FUJIAN, China

Product description

Product Name	Walkie Talkie
Brand Name	Nestling
Model Name	888S
Series Model	N/A
Test Standards	FCC Part 90 Rules
Test procedure	C63.26-2015

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 performance of tests	19 June 2018 ~03 July 2018
Date of Issue	03 July 2018
Test Result	Pass

Testing Engineer : Chris chen

(Chris chen)

Technical Manager : Sean She

(Sean she)

Authorized Signatory : Vita

(Vita Li)

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	03 July 2018	STS1806154W01	ALL	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Emission			
Standard	Item	Result	Remarks
FCC Part 90.205	Maximum Transmitter Power	PASS	
FCC Part 90.209	Occupied Bandwidth	PASS	
FCC Part 90.210	Emission Mask	PASS	
FCC Part 90.210	Transmitter Radiated Spurious Emssion	PASS	
FCC Part 90.210	Spurious Emssion on Antenna Port	PASS	
FCC Part 90.213	Frequency Stability Test	PASS	
FCC Part 90.210	Transmitter Frequency Behavior	PASS	
FCC Part 2.1047	Modulation Characteristic	PASS	

NOTE:

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

1.1 TEST FACILITY

Shenzhen STS Test Services Co., Ltd.
Add.: 1/F, Building 2, Zhuoke Science Park, Chongqing Road, Fuyong, Baoan District, Shenzhen, China.
CNAS Registration No.: L7649; FCC Registration No.: 625569
IC Registration No.: 12108A; A2LA Certificate No.: 4338.01;

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U，where expended 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 power,conducted	±0.70dB
2	Spurious emissions,conducted	±1.19dB
3	Spurious emissions,radiated((>1G)	±2.83dB
4	Spurious emissions,radiated(<1G)	±3.01dB
5	Temperature	±0.5°C
6	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	Walkie Talkie
Brand Name:	Nestling
Model Name:	888S
Series Model:	N/A
Model Difference description:	N/A
Operation Frequency Range	Frequency Range: 450.225MHz ~ 469.95MHz
Maximum Transmitter Power:	30.48dBm
Channel Separation:	25KHz
Modulation type:	FM
Adapter	Power supply and ADP(rating): Input: AC 110V-240V, 50/60Hz, 0.6A Output: DC 5V, 500mA
Battery	Battery(rating): Rated Voltage: 7.4V Capacity :1800mAh
Temperature Range:	-30℃-50℃
Test frequency list:	See Note 5
Software version number:	LT-666-LN-VER6.8
Hardware version number:	1.0

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Note: The product has the same digital working characters when operating in both two digitized voice/data mode. So only one set of test results for digital modulation modes are provided in this test report.
3. Please refer to Appendix B for the photographs of the EUT. For more details, please refer to the User's manual of the EUT.

4. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	Nestling	888S	whip antenna	NA	3	Antenna

The EUT antenna is External Antenna. No antenna other than that furnished by the responsible party shall be used with the device.

5. Test frequency list

Test Channel	Test Frequency (MHz)	Test Channel	Test Frequency (MHz)
CH01	462.125	CH09	462.925
CH02	462.225	CH10	463.025
CH03	462.325	CH11	463.125
CH04	462.425	CH12	463.225
CH05	462.525	CH13	463.525
CH06	462.625	CH14	450.225
CH07	462.725	CH15	460.325
CH08	462.825	CH16	469.950

Test channel

Channel Separation	Test Channel	Test Frequency (MHz)
25kHz	CH14	450.225
	CH07	462.725
	CH16	469.950

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test,please see the above listed frequency for testing.

2.2 EUT OPERATION MODE

The EUT has been tested under typical operating condition and The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements..

2.3 DESCRIPTION OF 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.

Final Test Mode	Power level	Channel Separation	Frenquency
Model 1	High rated power	25KHz	450.225
			462.725
			469.950

Model 1:
The equipment is set with FM modulation and 25.0KHz bandwidth at minimum rated power for transmitter,powered by DC 7.4V.

Note:

(1) Due to the different configuration and test, in this list only some worse mode. The worst test data of the worse modeis reported by this report.

2.4 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.

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

Item	Shielded Type	Ferrite Core	Length	Note
N/A	N/A	N/A	N/A	N/A

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

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.

2.7 TEST EQUIPMENT

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Signal Analyzer	Agilent	N9020A	MY49100060	2017.10.15	2018.10.14
Signal Generator	Agilent	N5182A	MY46240556	2017.10.15	2018.10.14
Audio Generator	TRONSON	TAG-101	20030212	2017.10.15	2018.10.14
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2018.11.01
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1343	2017.10.27	2018.10.26
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2017.10.15	2018.10.14
Pre-mplifier (0.1M-3GHz)	EM	EM330	60538	2018.03.11	2019.03.10
PreAmplifier (1G-26.5GHz)	Agilent	8449B	60538	2017.10.15	2018.10.14
Attenuator	HP	8494B	DC-18G	2017.10.15	2018.10.14
programmable power supply	Agilent	3642A	STS-S095	N.C.R	N.C.R
AC Power Source	APC	KDF-11010G	F214050035	N.C.R	N.C.R
Audio analyzer	R&S	UPL	100689	2018.03.08	2019.03.07
RF COMMUNICATION TEST SET	HP	N8920A	348A05658	2017.10.15	2018.10.14

3. MAXIMUM TRANSMITTER POWER

3.1 LIMITS

Per FCC Part 2.1046 and Part 90.205: Maximum ERP is dependent upon the station's antenna HAAT and required service area.

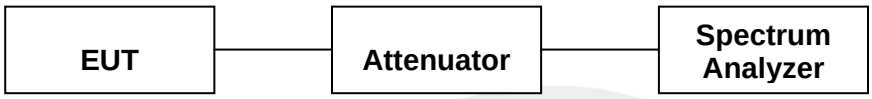
3.2 TEST PROCEDURE

Measurements shall be made to establish the radio frequency power delivered by the transmitter the standard output termination. The power output shall be monitored and recorded and no adjustment shall be made to the transmitter after the test has begun, except as noted bellow:
If the power output is adjustable, measurements shall be made for the highest and lowest power levels. The EUT connect to the Spectrum Analyzer through 40 dB attenuator.

3.3 DEVIATION FROM TEST STANDARD

No deviation

3.4 TEST SETUP BLOCK DIAGRAM

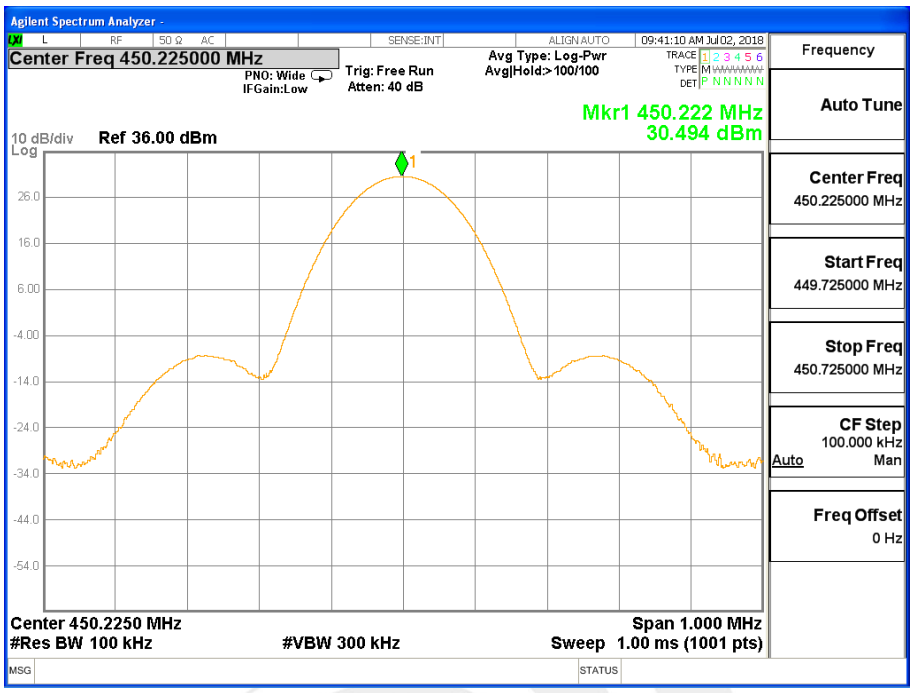


3.5 TEST RESULT

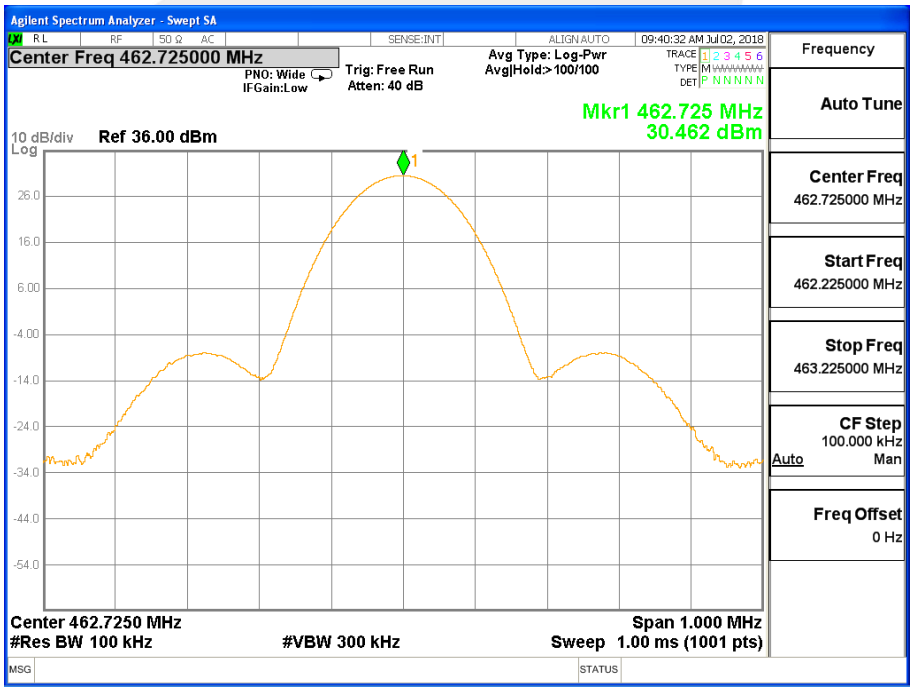
Modulation Type	Channel Sparation	Operation Mode	Test Channel	Test Frequency (MHz)	Test Results (dBm)	Test Results (W)
FM	25KHz	Mode1	CH14	450.2250	30.494	1.120
			CH07	462.7250	30.462	1.112
			CH16	469.9500	30.369	1.089

Note: Test power and rated power deviation does not exceed ± 20%.

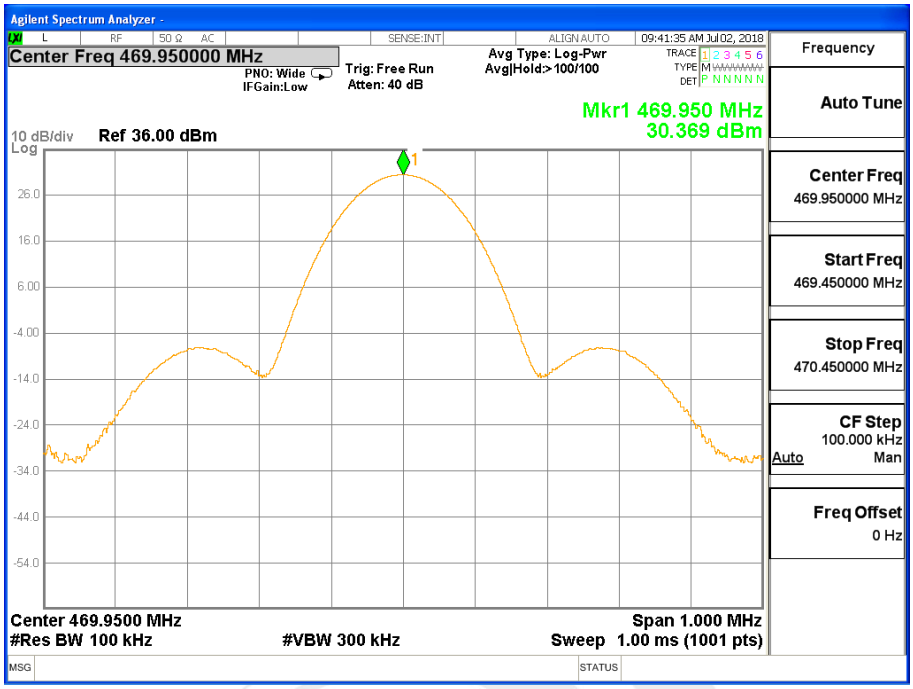
CH 14 Model 1



CH 07 Model 1



CH 16 Model 1


Agilent Spectrum Analyzer -
Center Freq 469.950000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
09:41:35 AM Jul 02, 2018
Mkr1 469.950 MHz
30.369 dBm
10 dB/div
Log
Ref 36.00 dBm
26.0
16.0
6.00
-4.00
-14.0
-24.0
-34.0
-44.0
-54.0
Center 469.9500 MHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1.000 MHz
Sweep 1.00 ms (1001 pts)
Frequency
Auto Tune
Center Freq
469.950000 MHz
Start Freq
469.450000 MHz
Stop Freq
470.450000 MHz
CF Step
100.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

4. OCCUPIED BANDWIDTH

4.1 LIMIT

Occupied Bandwidth: The EUT was connected to the audio signal generator and the spectrum analyzer via the main RF connector, and through an appropriate attenuator. The EUT was controlled to transmit its maximum power. Then the bandwidth of 99% power can be measured by the spectrum analyzer.

The maximum authorized bandwidth shall not be more than that normally authorized for voice operations.

4.2 MEASUREMENT PROCEDURE

a. The EUT was connected to the Spectrum Analyzer.

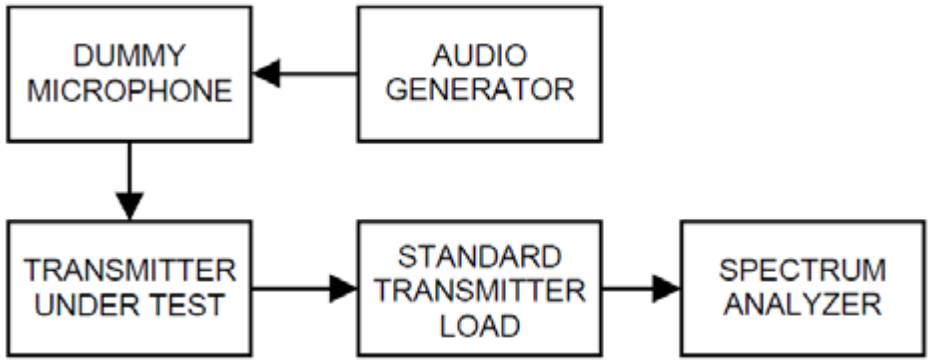
b. The EUT was modulated by 2.5KHz Sine wave audio signal; the level of the audio signal employed is 16dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5kHz (12.5kHz channel spacing) and 5kHz(25kHz channel spacing)

c. Set EUT as normal operation.

d. Set SPA Center Frequency=fundamental frequency, RBW=300Hz, VBW=3KHz, span =50KHz.

e Set SPA Max hold. Mark peak, Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.

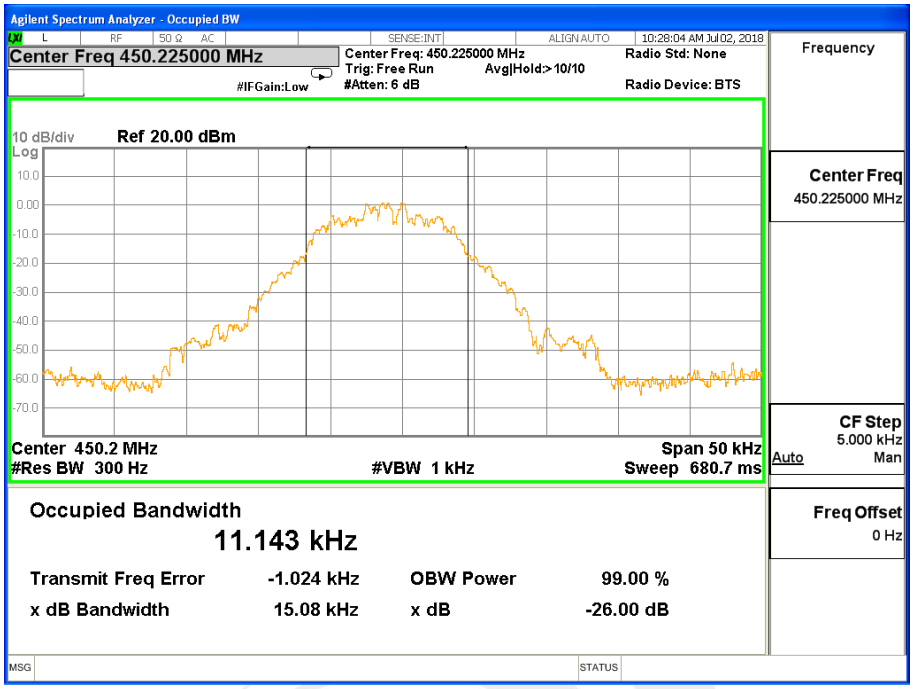
4.3 TEST SETUP BLOCK DIAGRAM



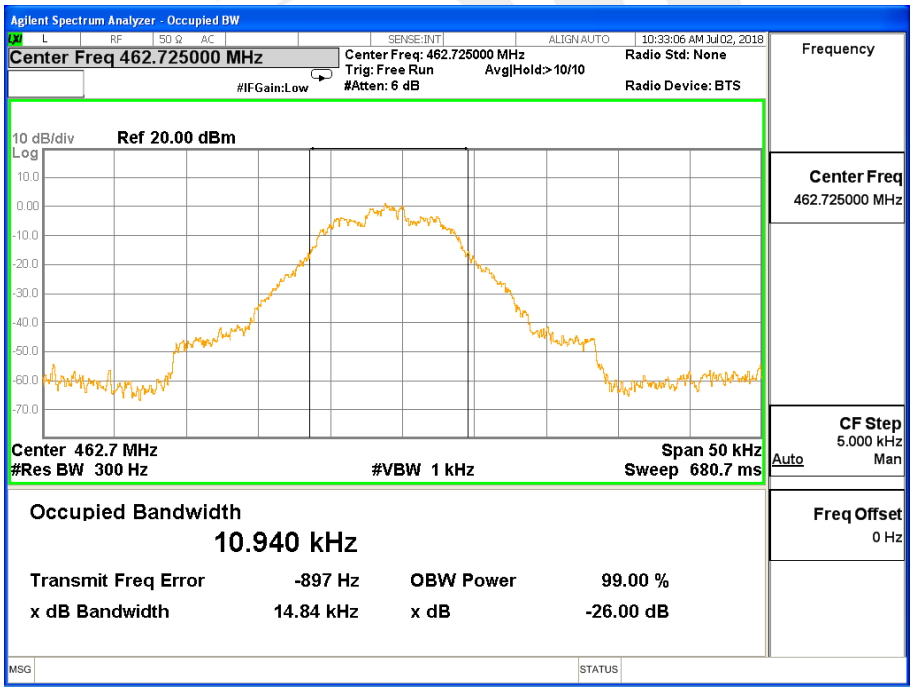
4.4 TEST RESULT

Modulation Type	Channel Sparation	Operation Mode	Test Channel	Test Frequency (MHz)	Occupied Bandwidth (KHz)	
					99%	26dB
FM	25.0KHz	Mode 1	CH14	450.2250	11.14	15.08
			CH07	462.7250	10.94	14.84
			CH16	469.9500	10.92	14.48

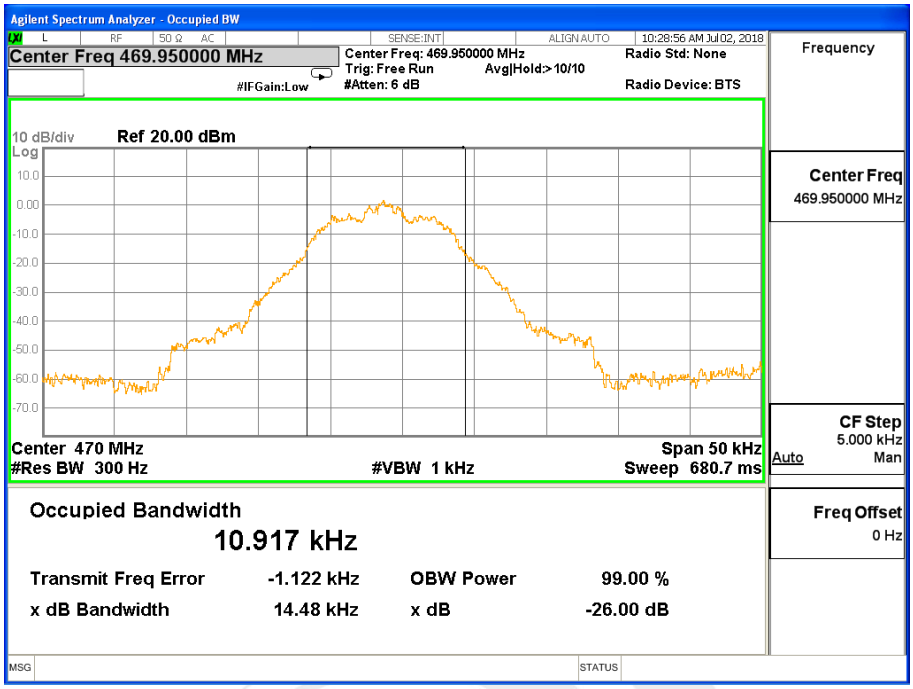
CH 14 Model 1



CH 07 Model 1



CH 16 Model 1


Agilent Spectrum Analyzer - Occupied BW
Center Freq 469.950000 MHz
Center Freq: 469.950000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 6 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10:28:56 AM Jul 02, 2018
Frequency
10 dB/div
Log
Ref 20.00 dBm
Center Freq
469.950000 MHz
Center 470 MHz
#Res BW 300 Hz
#VBW 1 kHz
Span 50 kHz
Sweep 680.7 ms
CF Step
5.000 kHz
Auto
Man
Occupied Bandwidth
10.917 kHz
Transmit Freq Error -1.122 kHz
OBW Power 99.00 %
x dB Bandwidth 14.48 kHz
x dB -26.00 dB
Freq Offset
0 Hz
MSG
STATUS

5. EMISSION MASK

5.1 PROVISIONS APPLICABLE

Emission Mask B: For transmitters that are equipped with an audio low-pass filter pursuant to §90.211(a), the power of any emission must be below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.

(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

5.2 MEASUREMENT PROCEDURE

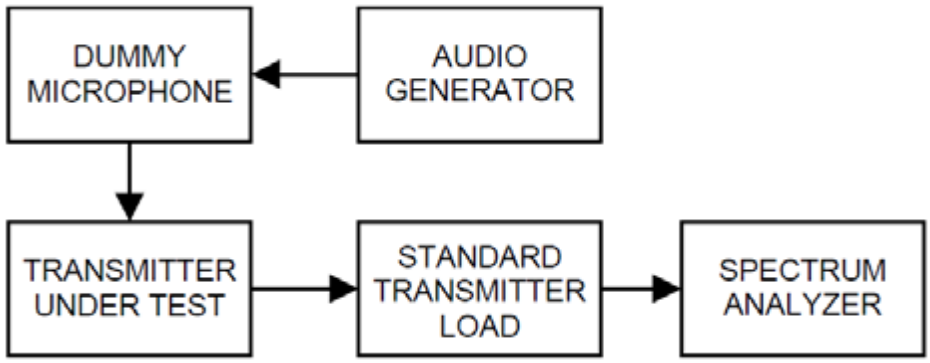
a. The EUT was connected to the Spectrum Analyzer.

b. The EUT was modulated by 2.5KHz Sine wave audio signal; the level of the audio signal employed is 16dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5kHz (12.5kHz channel spacing) and 5kHz(25kHz channel spacing)

c. Set EUT as normal operation.

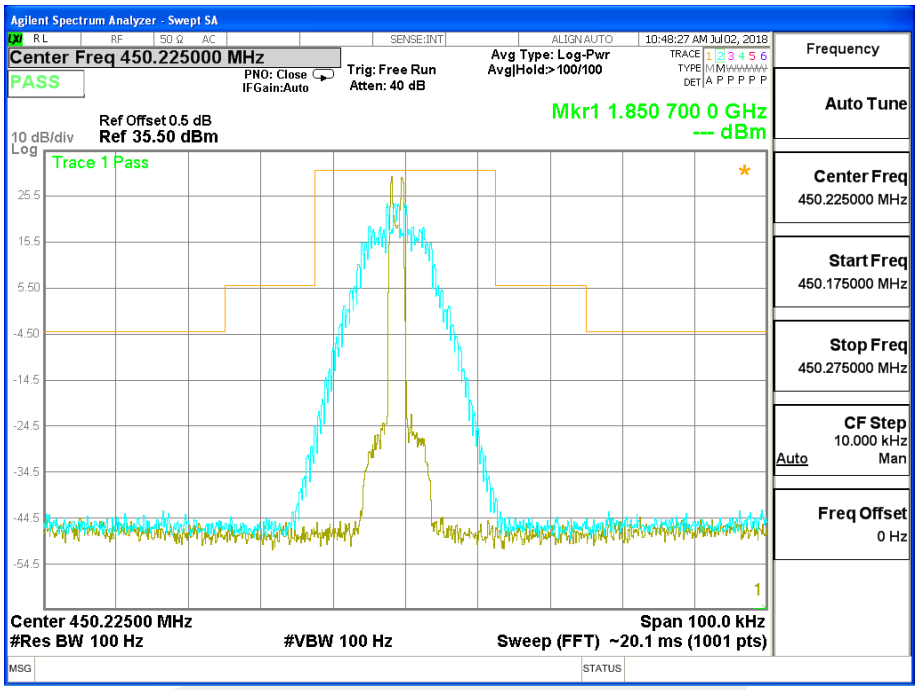
d Set SPA Center Frequency=fundamental frequency, RBW=300Hz, VBW=3KHz, span =50KHz.

5.3 TEST SETUP BLOCK DIAGRAM

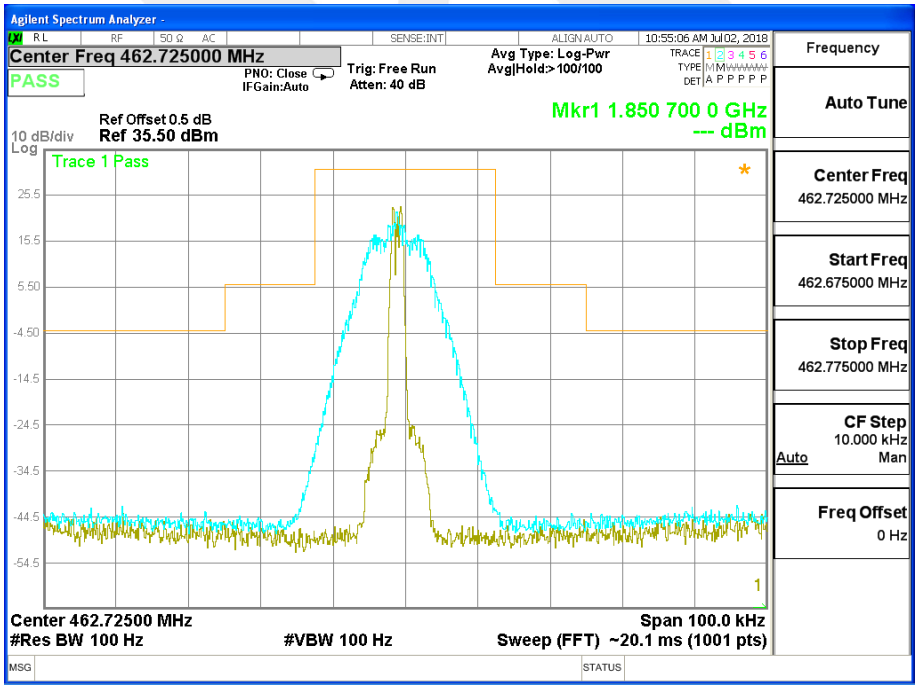


5.4 MEASUREMENT RESULT:

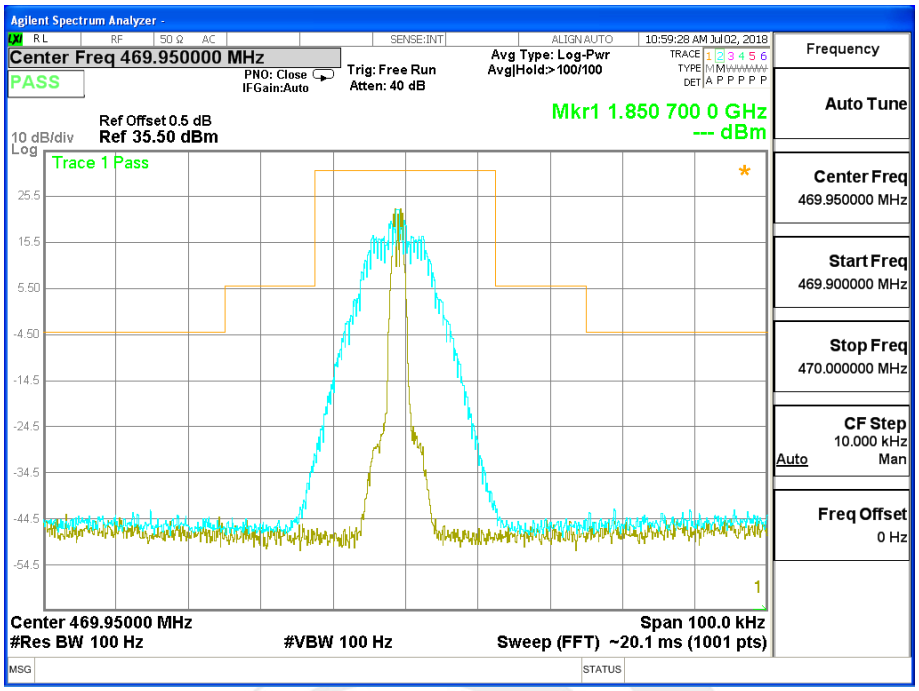
CH 14 Model 1



CH 07 Model 1



CH 16 Model 1


Agilent Spectrum Analyzer -
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
10:59:28 AM Jul 02, 2018
Center Freq 469.950000 MHz
PASS
PNO: Close
IFGain:Auto
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M M W W W W
DET A P P P P P
Mkr1 1.850 700 0 GHz
--- dBm
Ref Offset 0.5 dB
10 dB/div
Log
Ref 35.50 dBm
Trace 1 Pass
25.5
15.5
5.50
-4.50
-14.5
-24.5
-34.5
-44.5
-54.5
Center 469.95000 MHz
#Res BW 100 Hz
#VBW 100 Hz
Span 100.0 kHz
Sweep (FFT) ~20.1 ms (1001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
469.950000 MHz
Start Freq
469.900000 MHz
Stop Freq
470.000000 MHz
CF Step
10.000 kHz
Auto
Man
Freq Offset
0 Hz

6. TRANSMITTER RADIATED SPURIOUS EMSSION

6.1 PROVISIONS APPLICABLE

According to the TIA/EIA 603 test method, and according to Section 90.210, the power of each unwanted emission shall be less than Transmitted Power as specified below for transmitters designed to operate with 12.5 KHz channel bandwidth:

1. On any frequency removed from the center of the authorized bandwidth fo to 5.625 KHz removed from fo: Zero dB
2. On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) fo of more than 5.625 KHz but no more than 12.5 KHz: At least 7.27dB
3. On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) fo of more than 12.5 KHz: At least 50+10 log (P) dB or 70 dB, which ever is lesser attenuation.

For transmitters designed to transmit with 25 KHz channel separation and equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as following:

1. On any frequency removed from the assigned frequency by more than 50 percent, but no more than 100 percent of the authorized bandwidth: At least 25 dB.
2. On any frequency removed from the assigned frequency by more than 100 percent, but no more than 250 percent of the authorized bandwidth: At least 35 dB.
3. On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43+10Log (P) dB.

6.2TEST PROCEDURE

a. EUT was placed on a 1.50 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 1.50 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 six channels were measured with peak detector.

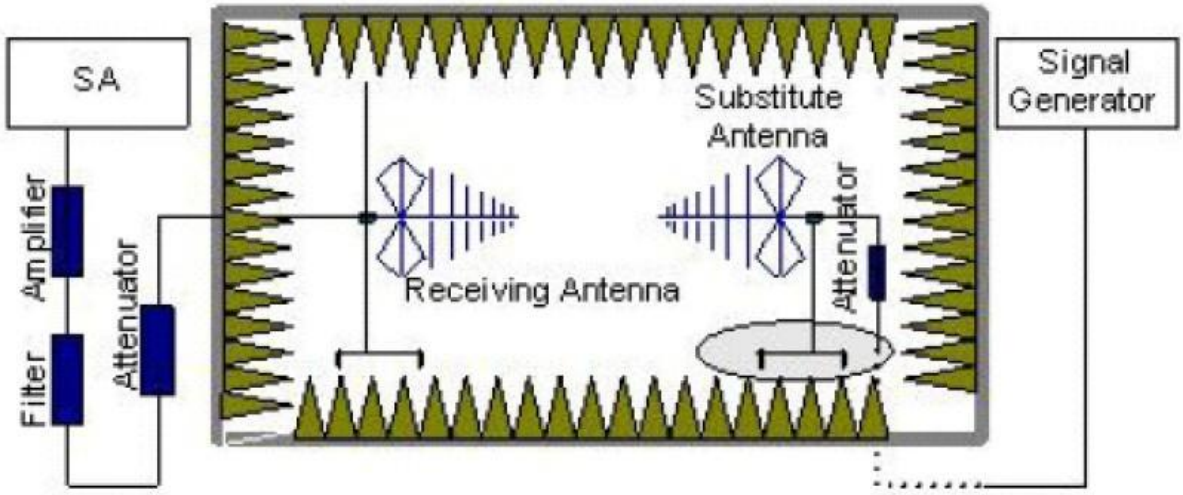
b. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions 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.

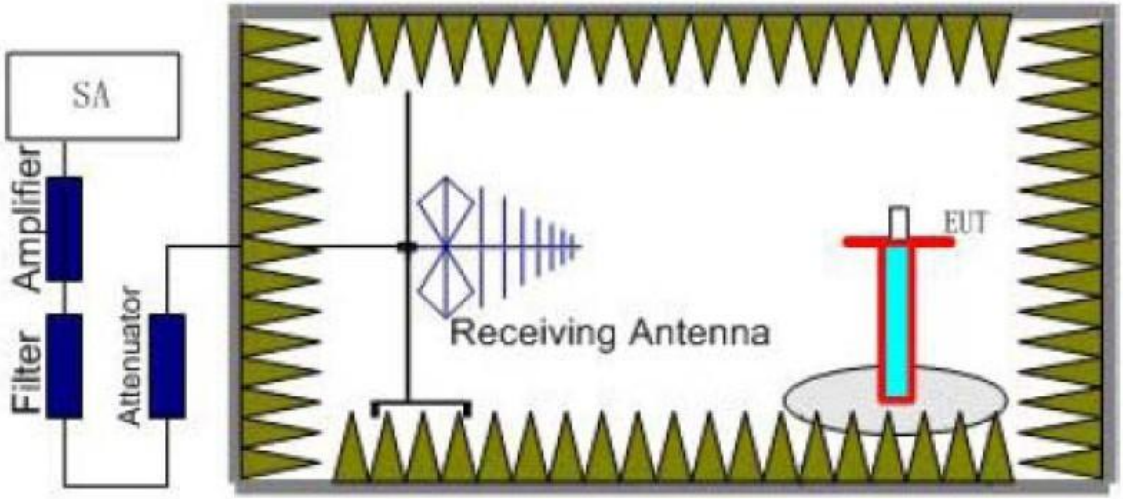
c. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100KHz,VBW=300KHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (P_r).

d. 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 (PMea) 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 (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

e. A 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:
Amplifier for substituation test; The measurement results are amend as described below:
Power(EIRP)=P_{Mea}- P_{cl}+ G_a

6.3 TEST CONFIGURATION





6.4 TEST RESULT

CH 14				Model 1			
Frequency	Result					Limit (dBm)	Conclusion
	P_{meas} (dBm)	Cable loss	Antenna Gain(dBi)	P_{Meas} E.I.R.P(dBm)	Polarization Of Max. EIRP		
450.23	-32.54	0.44	6.4	-28.73	Horizontal	-13	Pass
675.34	-35.56	1.02	8.63	-30.1	Horizontal	-13	Pass
900.45	-32.04	1.52	10.2	-25.51	Horizontal	-13	Pass
450.23	-35.39	0.44	6.4	-31.58	Vertical	-13	Pass
675.34	-32.03	1.02	8.63	-26.57	Vertical	-13	Pass
900.45	-35.42	1.52	10.2	-28.89	Vertical	-13	Pass

CH 07				Model 1			
Frequency	Result					Limit (dBm)	Conclusion
	P_{meas} (dBm)	Cable loss	Antenna Gain(dBi)	P_{Meas} E.I.R.P(dBm)	Polarization Of Max. EIRP		
462.73	-34.46	0.44	6.4	-30.65	Horizontal	-13	Pass
694.09	-37.51	1.13	8.63	-32.16	Horizontal	-13	Pass
925.45	-33.82	1.57	10.2	-27.34	Horizontal	-13	Pass
462.73	-37.33	0.44	6.4	-33.52	Vertical	-13	Pass
694.09	-33.79	1.13	8.63	-28.44	Vertical	-13	Pass
925.45	-37.18	1.57	10.2	-30.7	Vertical	-13	Pass

CH 16				Model 1			
Frequency	Result					Limit (dBm)	Conclusion
	P_{meas} (dBm)	Cable loss	Antenna Gain(dBi)	P_{Meas} E.I.R.P(dBm)	Polarization Of Max. EIRP		
469.95	-33.42	0.46	6.4	-29.63	Horizontal	-13	Pass
704.93	-36.56	1.17	8.63	-31.25	Horizontal	-13	Pass
939.90	-32.51	1.63	10.2	-26.09	Horizontal	-13	Pass
469.95	-36.19	0.46	6.4	-32.4	Vertical	-13	Pass
704.93	-32.97	1.17	8.63	-27.66	Vertical	-13	Pass
939.90	-35.91	1.63	10.2	-29.49	Vertical	-13	Pass

Note: $EIRP=P_{Mea}(dBm)-P_{cl}(dB)+G_a(dBi)$

We were not recorded other points as values lower than limits

7. SPURIOUS EMSSION ON ANTENNA PORT

7.1 PROVISIONS APPLICABLE

According to the TIA/EIA 603 test method, and according to Section 90.210, the power of each unwanted emission shall be less than Transmitted Power as specified below for transmitters designed to operate with 12.5 KHz channel bandwidth:

1. On any frequency removed from the center of the authorized bandwidth fo to 5.625 KHz removed from fo: Zero dB
2. On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) fo of more than 5.625 KHz but no more than 12.5 KHz: At least 7.27dB
3. On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) fo of more than 12.5 KHz: At least 50+10 log (P) dB or 70 dB, which ever is lesser attenuation.

For transmitters designed to transmit with 25 KHz channel separation and equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as following:

1. On any frequency removed from the assigned frequency by more than 50 percent, but no more than 100 percent of the authorized bandwidth: At least 25 dB.
2. On any frequency removed from the assigned frequency by more than 100 percent, but no more than 250 percent of the authorized bandwidth: At least 35 dB.
3. On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43+10Log (P) dB.

7.2 MEASUREMENT PROCEDURE

a. The EUT was connected to the Spectrum Analyzer.

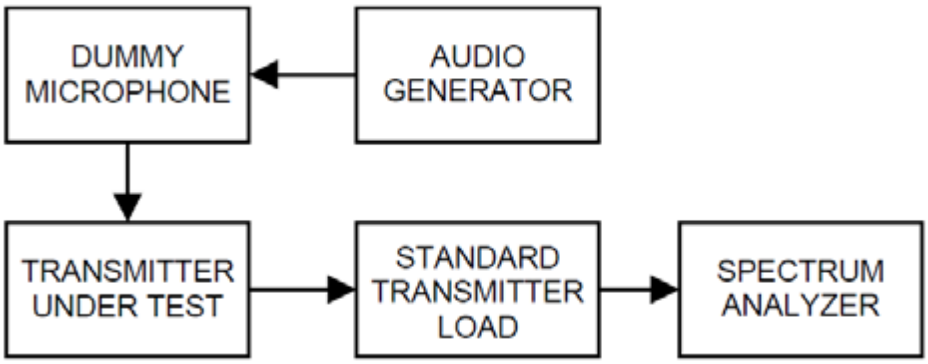
b. Sufficient scans were taken to show any out of band emission up to 10th. Harmonic for the lower and the highest frequency range.

c. Set EUT as normal operation.

d Set RBW 100kHz, VBW 300 kHz in the frequency band 30MHz to 1GHz,while set RBW=1MHz. VBW=3MHz from the 1GHz to 10th Harmonic.

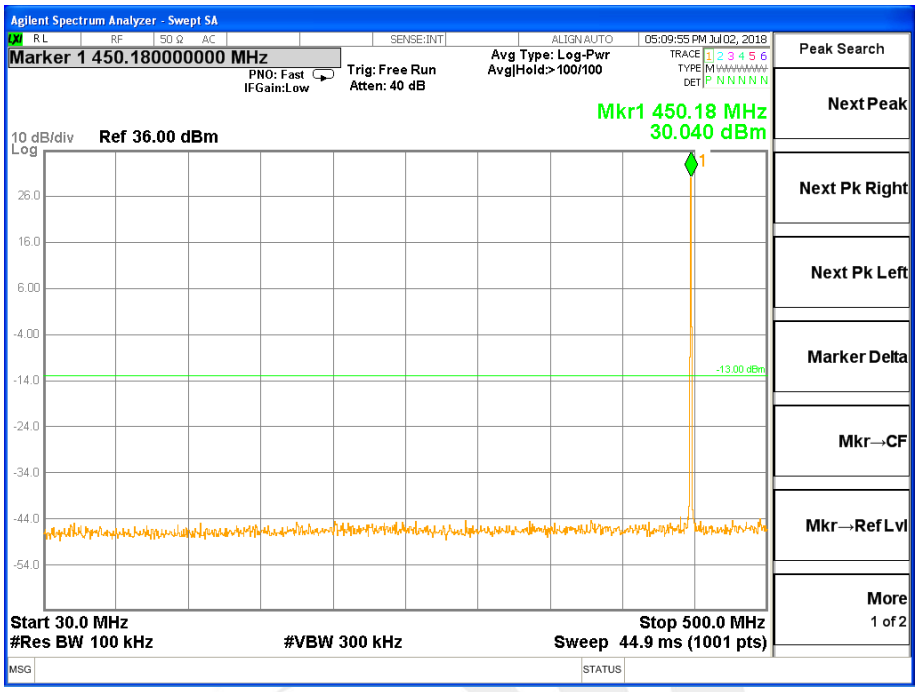
e The audio input was set to 0 to get the unmodulated carrier, the resulting picture is print out for each channel separation.

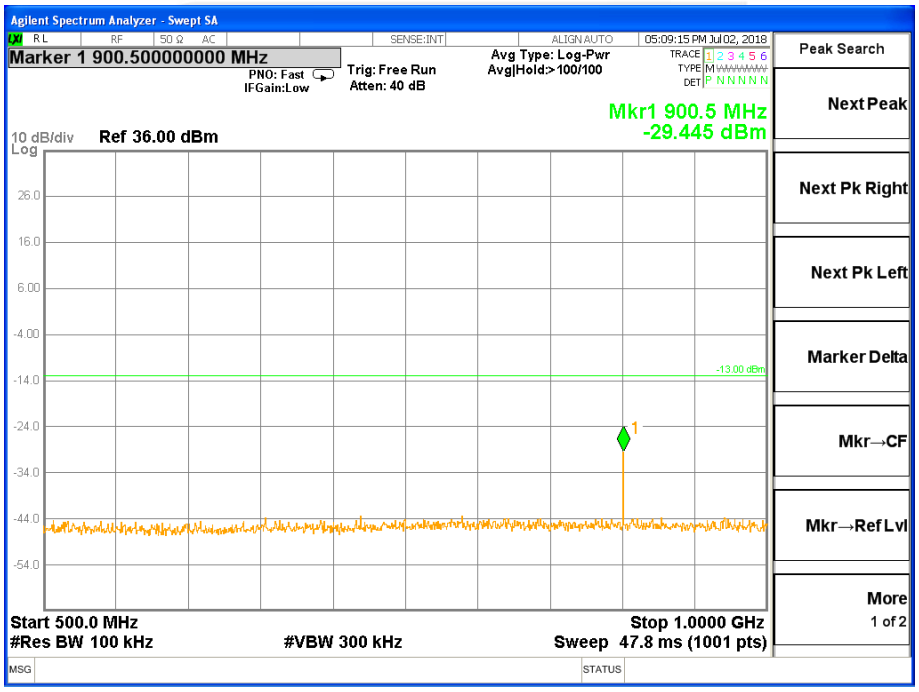
7.3 TEST SETUP BLOCK DIAGRAM

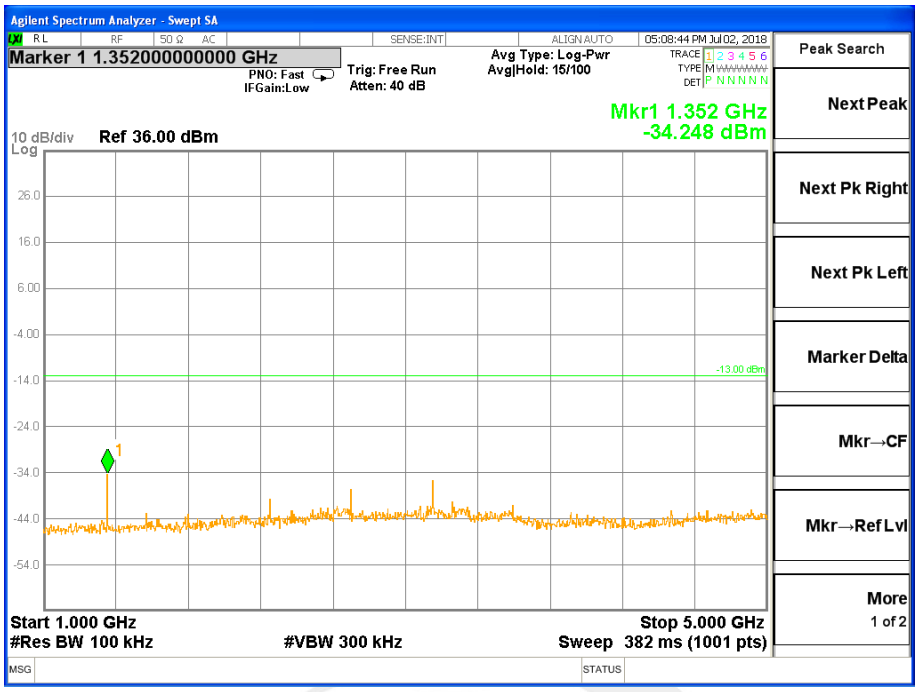


7.4 TEST RESULT

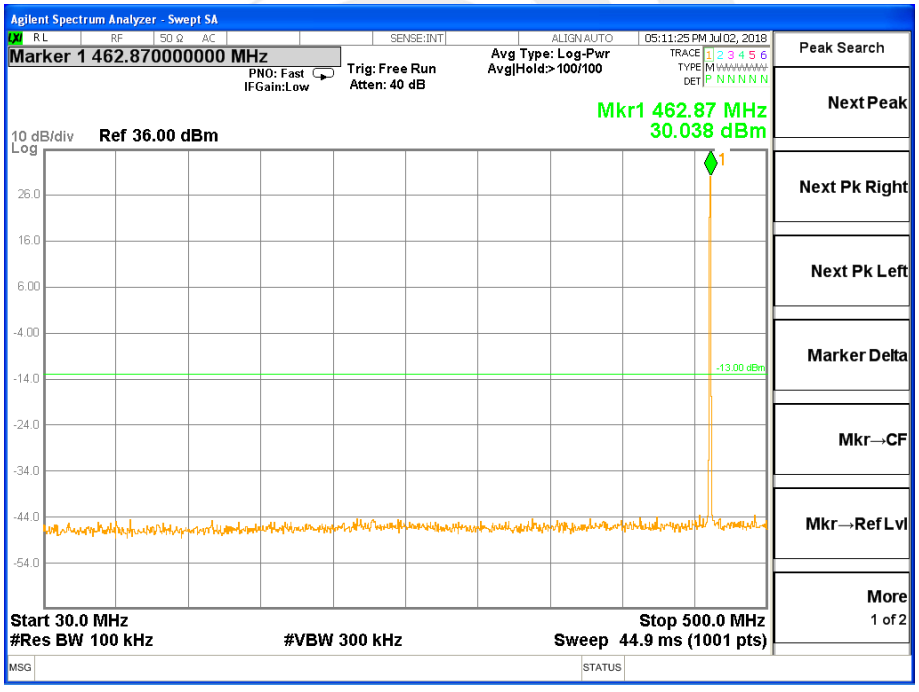
CH 14 Model 1

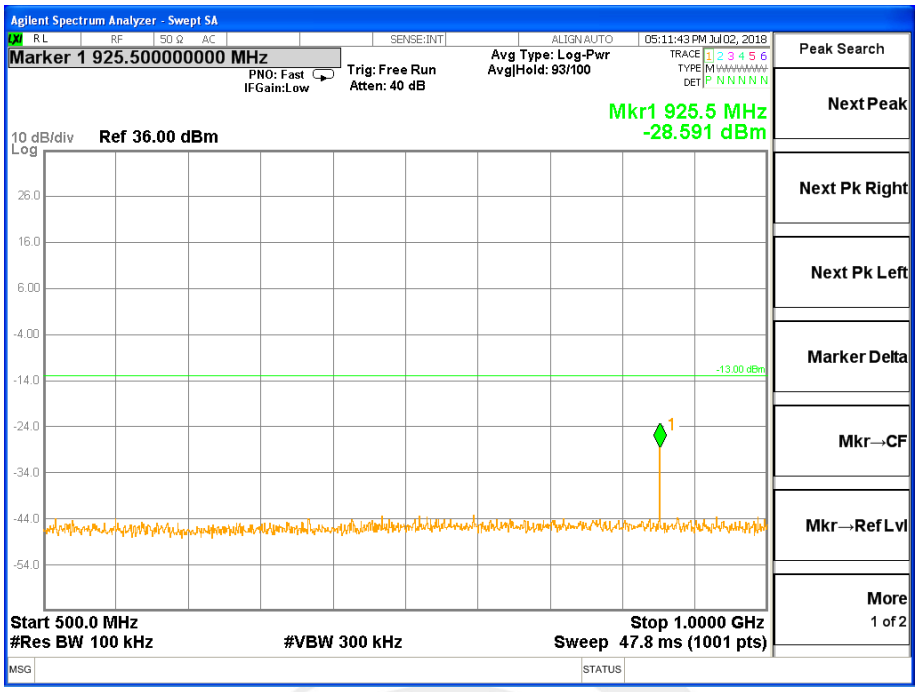


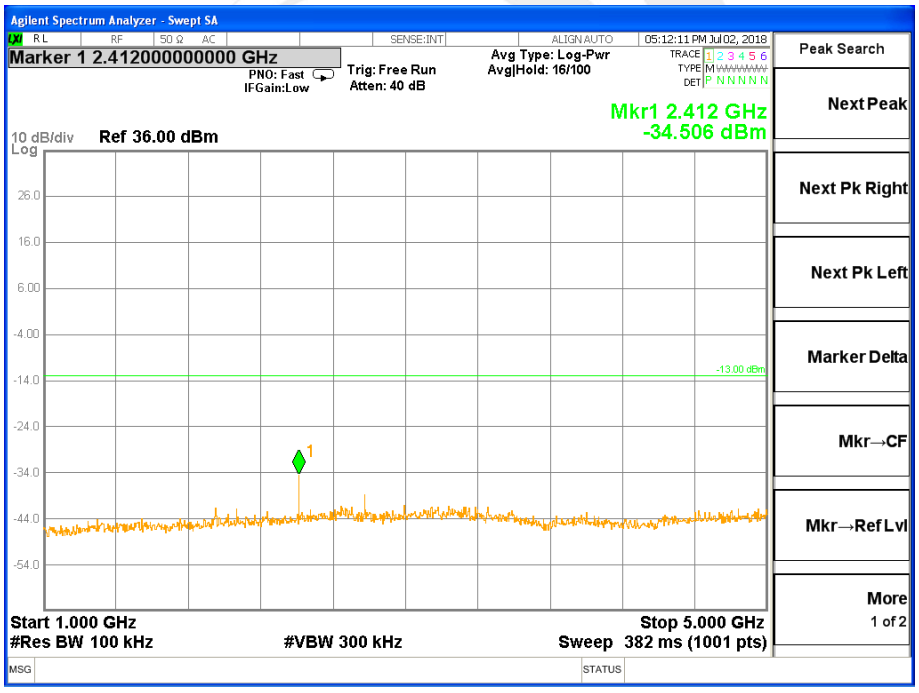



Agilent Spectrum Analyzer - Swept SA
Marker 1 1.352000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 15/100
05:08:44 PM Jul 02, 2018
Mkr1 1.352 GHz
-34.248 dBm
10 dB/div
Log
Ref 36.00 dBm
-13.00 dBm
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 5.000 GHz
Sweep 382 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

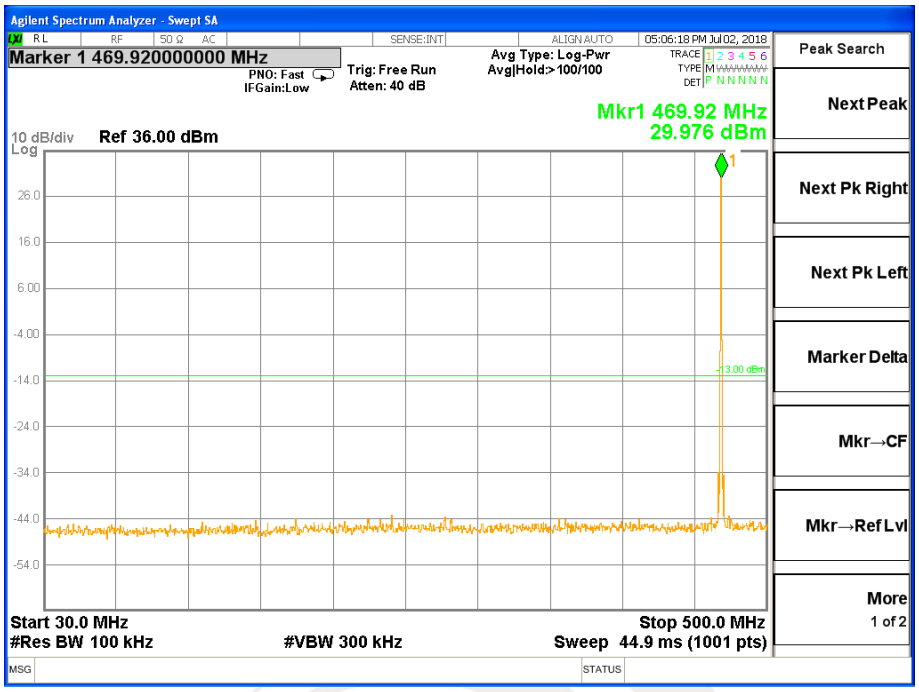
CH07 Model 1

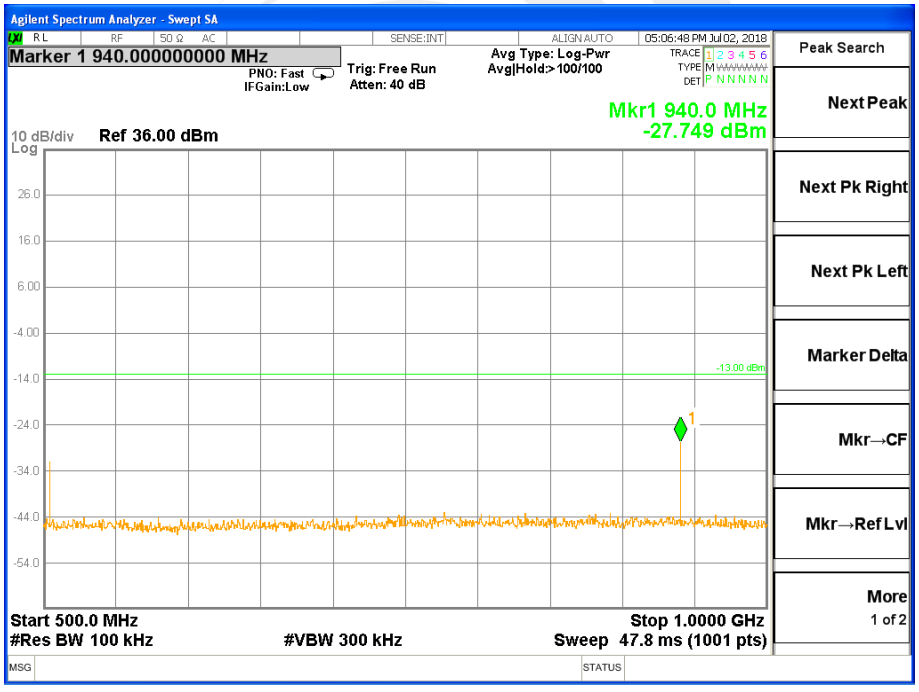

Agilent Spectrum Analyzer - Swept SA
Marker 1 462.870000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
05:11:25 PM Jul 02, 2018
Mkr1 462.87 MHz
30.038 dBm
10 dB/div
Log
Ref 36.00 dBm
-13.00 dBm
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 500.0 MHz
Sweep 44.9 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

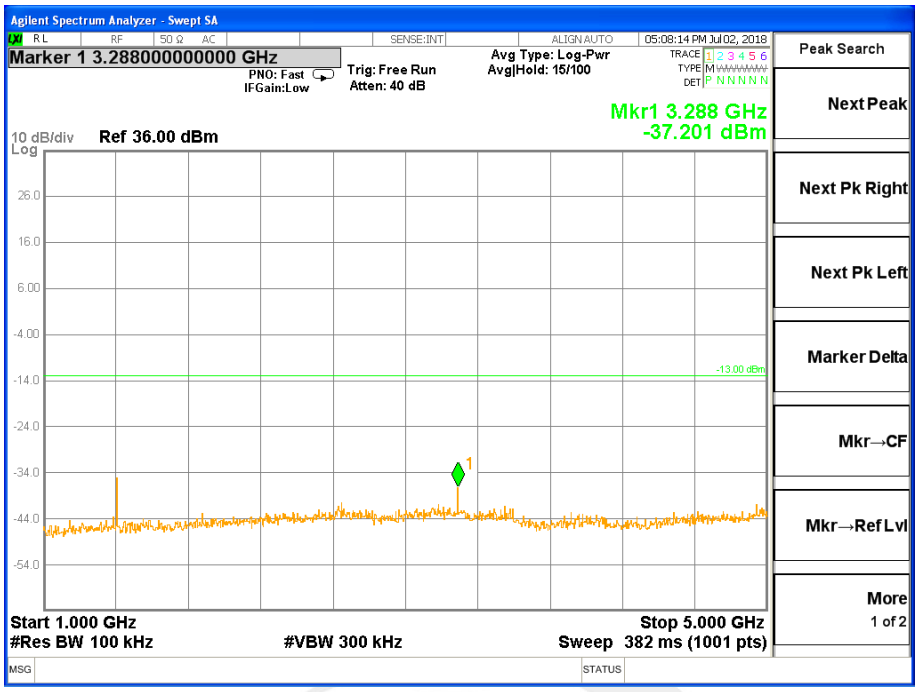

Agilent Spectrum Analyzer - Swept SA
Marker 1 925.500000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 93/100
05:11:43 PM Jul 02, 2018
Mkr1 925.5 MHz
-28.591 dBm
10 dB/div
Log
Ref 36.00 dBm
-13.00 dBm
Start 500.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 47.8 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS


Agilent Spectrum Analyzer - Swept SA
Marker 1 2.412000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 16/100
05:12:11 PM Jul 02, 2018
Mkr1 2.412 GHz
-34.506 dBm
10 dB/div
Log
Ref 36.00 dBm
-13.00 dBm
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 5.000 GHz
Sweep 382 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

CH 16 Model 1


Agilent Spectrum Analyzer - Swept SA
Marker 1 469.920000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
05:06:18 PM Jul 02, 2018
Mkr1 469.92 MHz
29.976 dBm
10 dB/div
Log
Ref 36.00 dBm
-13.00 dBm
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 500.0 MHz
Sweep 44.9 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 1 940.000000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
05:06:48 PM Jul 02, 2018
Mkr1 940.0 MHz
-27.749 dBm
10 dB/div
Log
Ref 36.00 dBm
-13.00 dBm
Start 500.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 47.8 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
05:08:14 PM Jul 02, 2018
Marker 1 3.288000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold: 15/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 3.288 GHz
-37.201 dBm
10 dB/div
Log
Ref 36.00 dBm
26.0
16.0
6.00
-4.00
-14.0
-24.0
-34.0
-44.0
-54.0
-13.00 dBm
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 5.000 GHz
Sweep 382 ms (1001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

8. FREQUENCY STABILITY

8.1 PROVISIONS APPLICABLE

1) According to FCC Part 2 Section 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30℃ to +50℃ centigrade.
2) According to FCC Part 2 Section 2.1055 (a) (2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.
3) Vary primary supply voltage from 85 to 115 percent of the nominal value.
4) According to §90.213, the frequency stability limit is 1.5 ppm for 12.5KHz channel separation

Frequency Range (MHz)	Channel Bandwidth (KHz)	Frequency Tolerance (ppm)		
		Fixed and Base Stations	Mobile Stations	
			> 2 W	≤ 2 W
150-174 MHz	6.25 12.5 25	1.0 2.5 5.0	2.0 5.0 5.0	2.0 5.0 50.0*
421-512 MHz	6.25 12.5 25	0.5 1.5 2.5	1.0 2.5 5.0	1.0 2.5 5.0

- Stations operating in the 154.45 to 154.49 MHz or the 173.2 to 173.4 MHz bands must have a frequency stability of 5 ppm.
- Paging transmitters operating on paging-only frequencies must operate with frequency stability of 5 ppm in the 150-174 MHz band and 2.5 ppm in the 421-512 MHz band.

8.2 MEASUREMENT PROCEDURE

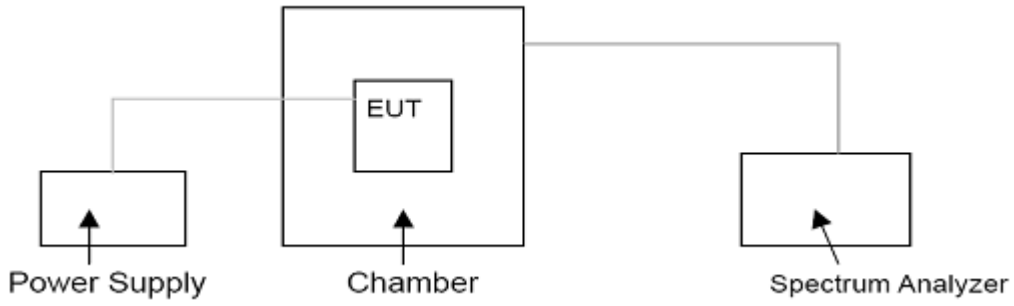
a. The EUT was connected to the Spectrum Analyzer.

b. The EUT was set in the climate chamber and connected to an external DC power supply

c. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded.

d For Frequency stability Vs. Voltage the EUT was connected to a DC power supply and the voltage was adjusted in the required ranges. The result was recorded.

8.3 TEST SETUP BLOCK DIAGRAM



8.4 TEST RESULT

Operation Mode	Condition (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	ppm	Limit	Result
Mode 1	25	450.2250	450.2245	-1.111	5ppm	PASS
	-30	450.2250	450.2244	-1.316		
	-20	450.2250	450.2242	-1.715		
	-10	450.2250	450.2245	-1.212		
	0	450.2250	450.2242	-1.746		
	10	450.2250	450.2244	-1.316		
	20	450.2250	450.2243	-1.602		
	30	450.2250	450.2243	-1.547		
	40	450.2250	450.2243	-1.516		
	50	450.2250	450.2243	-1.637		

Operation Mode	Condition (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	ppm	Limit	Result
Mode 1	25	462.7250	462.7244	-1.306	5ppm	PASS
	-30	462.7250	462.7242	-1.696		
	-20	462.7250	462.7245	-1.138		
	-10	462.7250	462.7245	-1.127		
	0	462.7250	462.7242	-1.696		
	10	462.7250	462.7245	-1.105		
	20	462.7250	462.7243	-1.597		
	30	462.7250	462.7245	-1.090		
	40	462.7250	462.7244	-1.381		
	50	462.7250	462.7242	-1.696		

Operation Mode	Condition (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	ppm	Limit	Result
Mode 1	25	469.9500	469.9490	-2.128	5ppm	PASS
	-30	469.9500	469.9487	-2.692		
	-20	469.9500	469.9488	-2.494		
	-10	469.9500	469.9489	-2.370		
	0	469.9500	469.9487	-2.692		
	10	469.9500	469.9488	-2.506		
	20	469.9500	469.9490	-2.232		
	30	469.9500	469.9488	-2.545		
	40	469.9500	469.9489	-2.386		
	50	469.9500	469.9487	-2.724		

9. TRANSMITTER FREQUENCY BEHAVIOR

9.1 PROVISIONS APPLICABLE

Section 90.214

Transient frequencies must be within the maximum frequency difference limits during the time intervals indicated:

Time intervals [1, 2]	Maximum frequency difference [3]	All equipment	
		150 to 174 MHz	421 to 512MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 KHz Channels			
t_1 [4]	± 25.0 KHz	5.0 ms	10.0 ms
t_2	± 12.5 KHz	20.0 ms	25.0 ms
t_3 [4]	± 25.0 KHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 KHz Channels			
t_1 [4]	± 12.5 KHz	5.0 ms	10.0 ms
t_2	± 6.25 KHz	20.0 ms	25.0 ms
t_3 [4]	± 12.5 KHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 6.25 KHz Channels			
t_1 [4]	±6.25 KHz	5.0 ms	10.0 ms
t_2	±3.125 KHz	20.0 ms	25.0 ms
t_3 [4]	±6.25 KHz	5.0 ms	10.0 ms

1. t_{on} is the instant when a 1 KHz test signal is completely suppressed, including any capture time due to phasing.
   t_1 is the time period immediately following t_{on}.
   t_2 is the time period immediately following t_1.
   t_3 is the time period from the instant when the transmitter is turned off until t_{off}.
   t_{off} is the instant when the 1 KHz test signal starts to rise.
2. During the time from the end of t_2 to the beginning of t_3, the frequency difference must not exceed the limits specified in § 90.213.
3. Difference between the actual transmitter frequency and the assigned transmitter frequency.
4. If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

9.2 MEASUREMENT PROCEDURE

Use Digital portable radio which manufactured by VictelGlobal Communications Corporation

a. Limited which uses same protocol as the DUT connect to RX antenna by 20Att in order to avoid damaging DUT;

b. Connect DUT into Test discriminator and Storage Oscilloscope and keep DUT stats ON;

c. Inut 1KHz signal into digital portable radio;

d Set the modulation domain analyzer to trigger on the rising edge of the waveform in order to capture a single-shot turn-on of the transmitter signals;

e Keep the digital protable radio in OFF state and Key the PTT of digital portable radio;

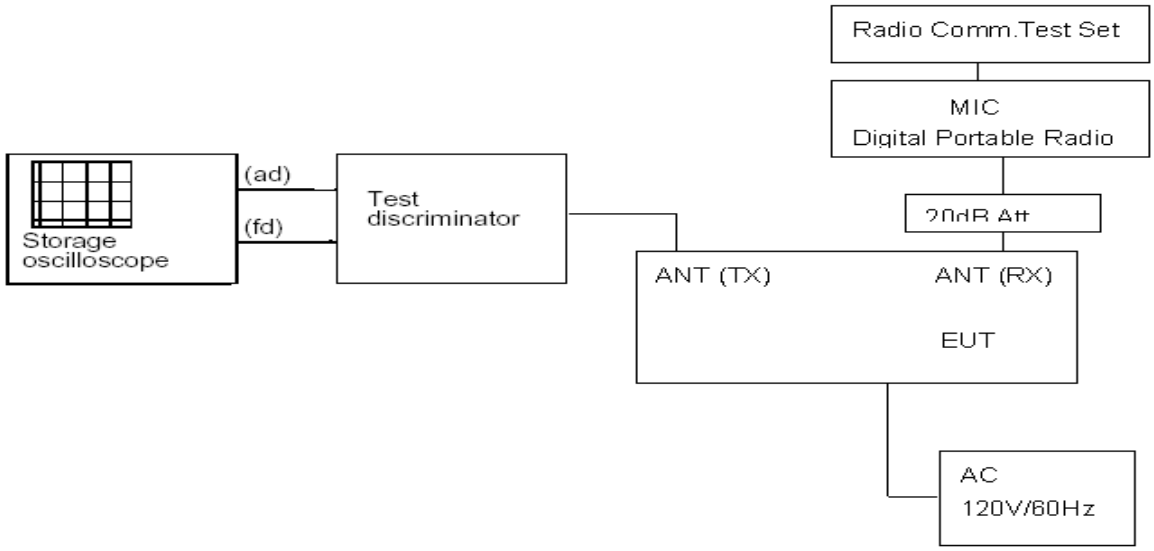
f Observe the stored oscilloscope of modulation domain analyzer.The signal trace shall be maintained within the allowable limits during the periods t_1 and t_2,and shall also remain within limits following t_2;

g Adjust the modulation domain anzlyzer to trigger on the falling edge of the transmitter waveform in order to capture a single-shot turn-off transmitter of the transmitter signal.

h Keep the digital portable radio in ON state and Unkey the PTT of digital portable radio;

f Observe the stored oscilloscope of modulation domain analyzer.The signal trace shall be maintained within the allowable limits during the period t_3

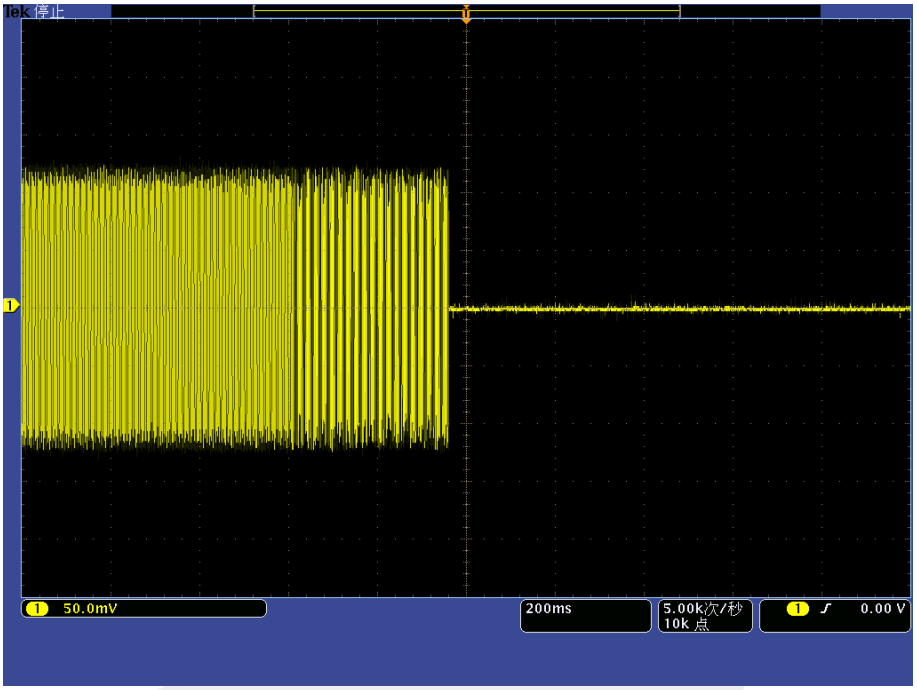
9.3 TEST SETUP BLOCK DIAGRAM



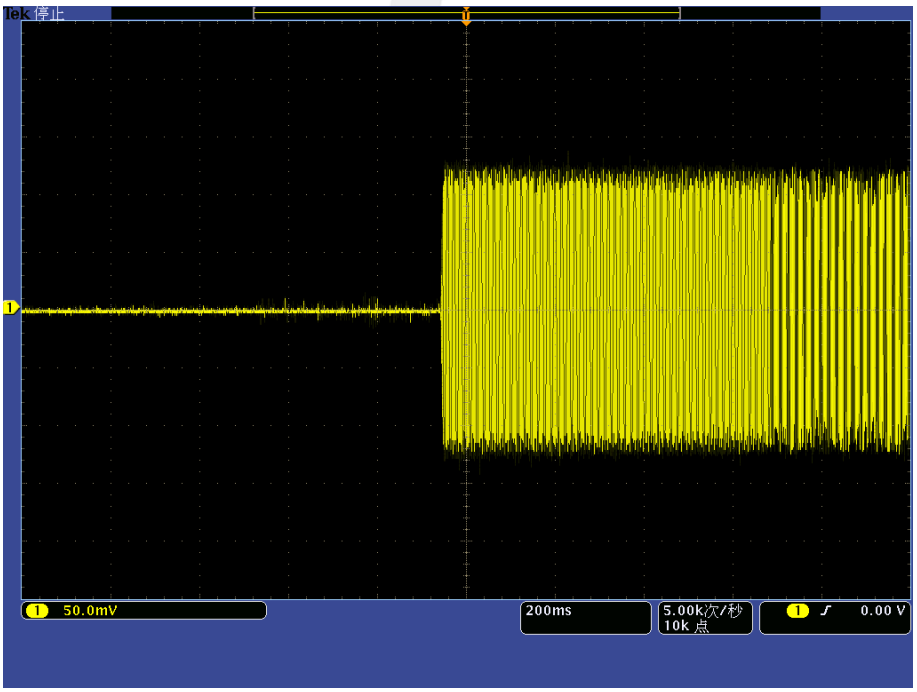
9.4 TEST RESULT

Mode 1

Transmitter Frequency Behaviour @ 25 KHz Channel Separation------Off – On



Transmitter Frequency Behaviour @ 25 KHz Channel Separation------On – Off



10. MODULATION CHARACTERISTIC

10.1 APPLIED PROCEDURES / LIMIT

FCC Part 2.1047

(a) Equipment which utilizes voice modulated communication show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

(b) Equipment which employs modulation limiting,a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

10.2 TEST PROCEDURE

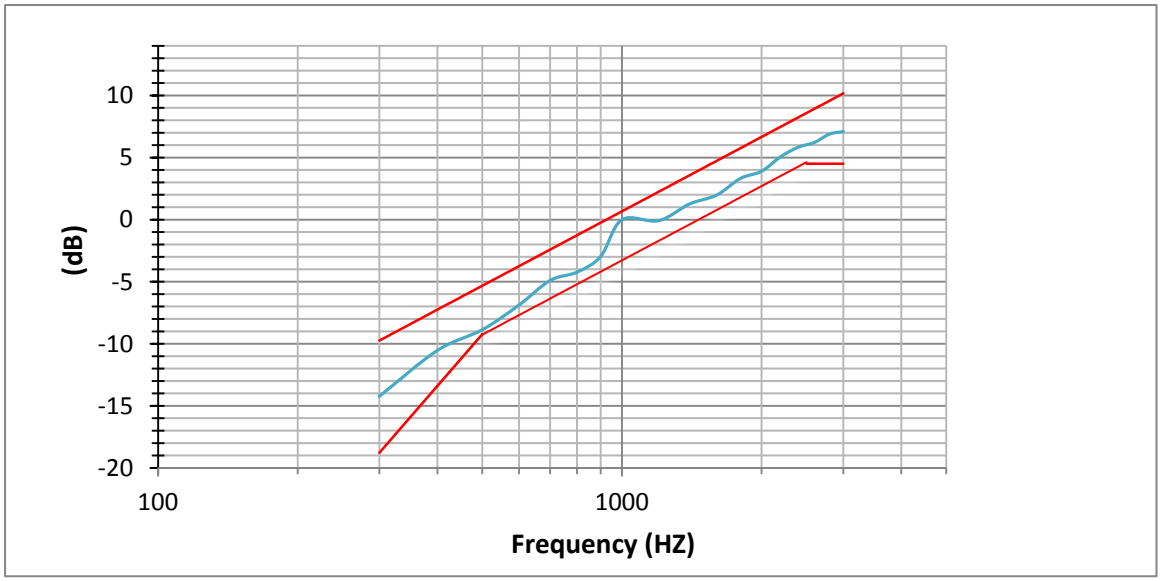
The test procedure please reference ANSI C63.26-2015.

10.3 TEST RESULT

10.3.1 Audio Frequency Response

Mode 1(Carrier Frequency:462.725,Channel Separetion:25KHz,High Power)

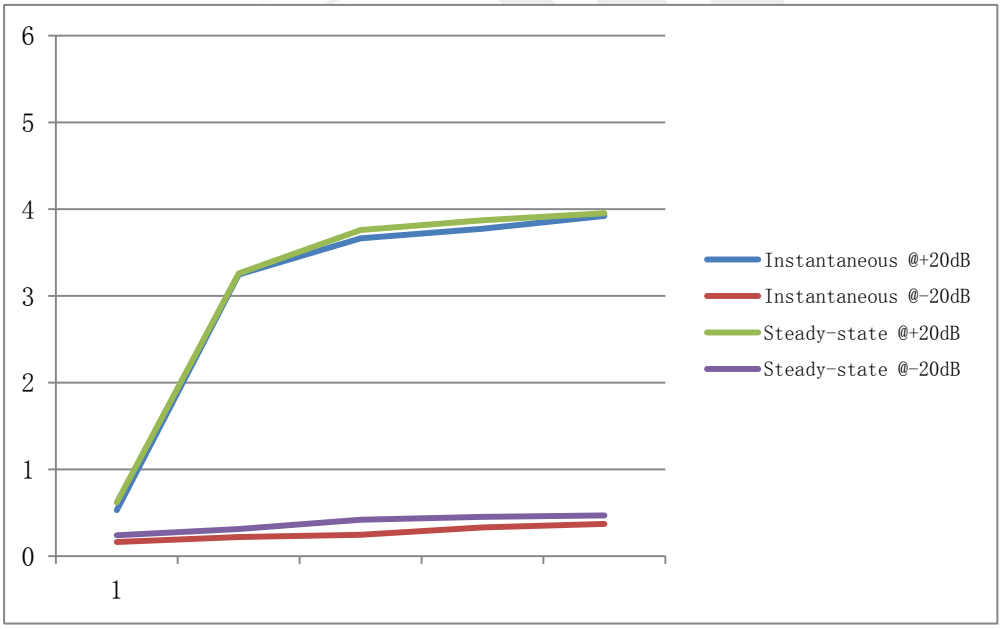
Audio Frequency	Audio Frequency Response	
(Hz)	(dB)	
300	-14.23	
400	-10.54	
500	-8.87	
600	-6.88	
700	-4.90	
800	-4.23	
900	-2.96	
1000	0.00	Result
1200	-0.08	
1400	1.27	
1600	1.98	
1800	3.32	
2000	3.90	
2200	5.08	
2400	5.84	
2600	6.22	
2800	6.89	
3000	7.1	



10.3.2 Modulation Limiting

Mode 1(Carrier Frequency:462.725,Channel Separetion:25kHz,High Power)

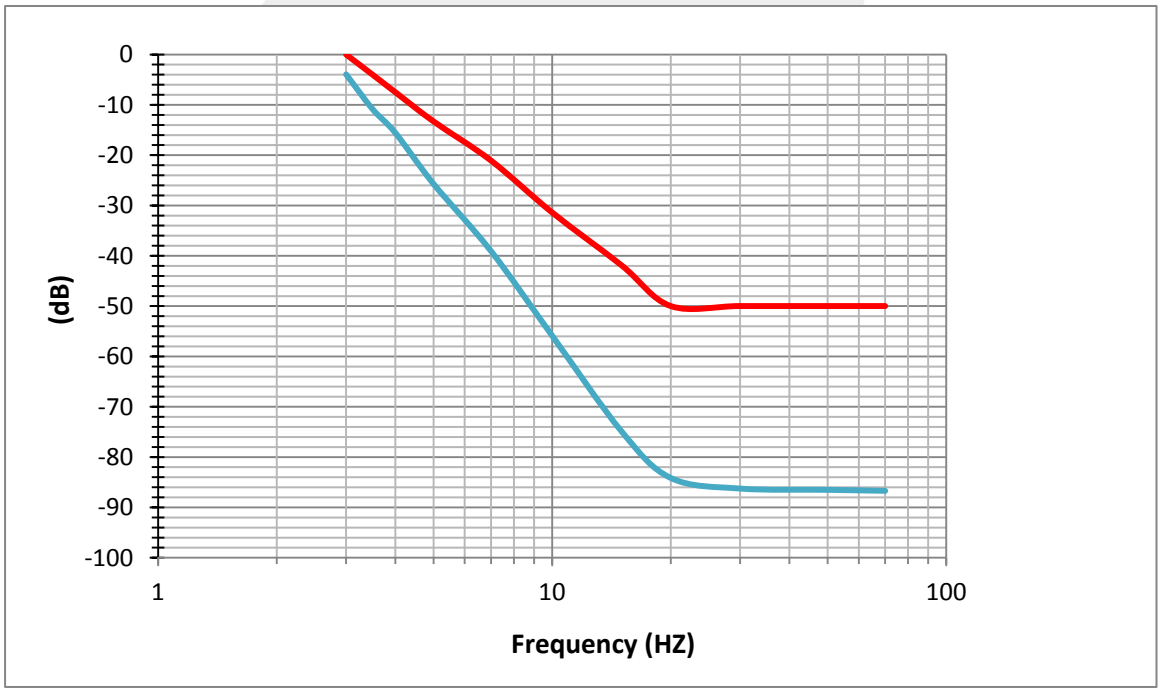
Audio Frequency	Instantaneous		Steady-state		Limit (kHz)	Result
(Hz)	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)		
300	0.532	0.164	0.619	0.242	±5	Pass
1000	3.247	0.221	3.259	0.314		
1500	3.663	0.247	3.759	0.421		
2500	3.774	0.332	3.872	0.453		
3000	3.922	0.373	3.953	0.471		



10.3.3 Audio Low Pass Filter Response

Mode 1(Carrier Frequency:462.725,Channel Separetion:25kHz,High Power)

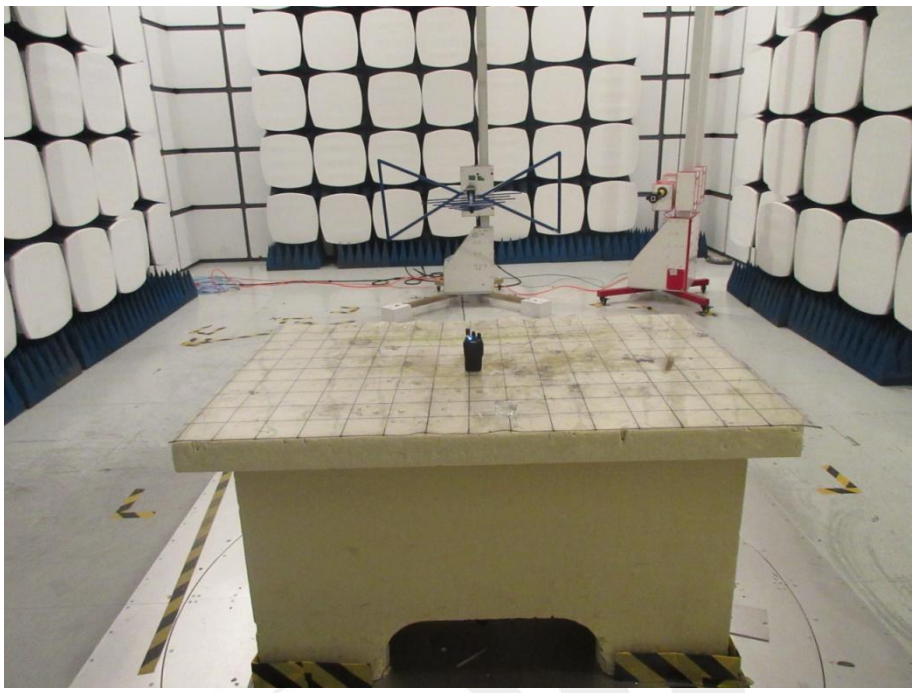
Audio Frequency (KHz)	Response Attenuation (dB)	Limit	Result
3	-3.93	0	Pass
3.5	-10.83	-4	
4	-15.56	-7.5	
5	-25.70	-13.3	
7	-39.09	-21.1	
10	-55.88	-31.4	
15	-74.89	-41.9	
20	-84.15	-50	
30	-86.26	-50	
50	-86.51	-50	
70	-86.71	-50	



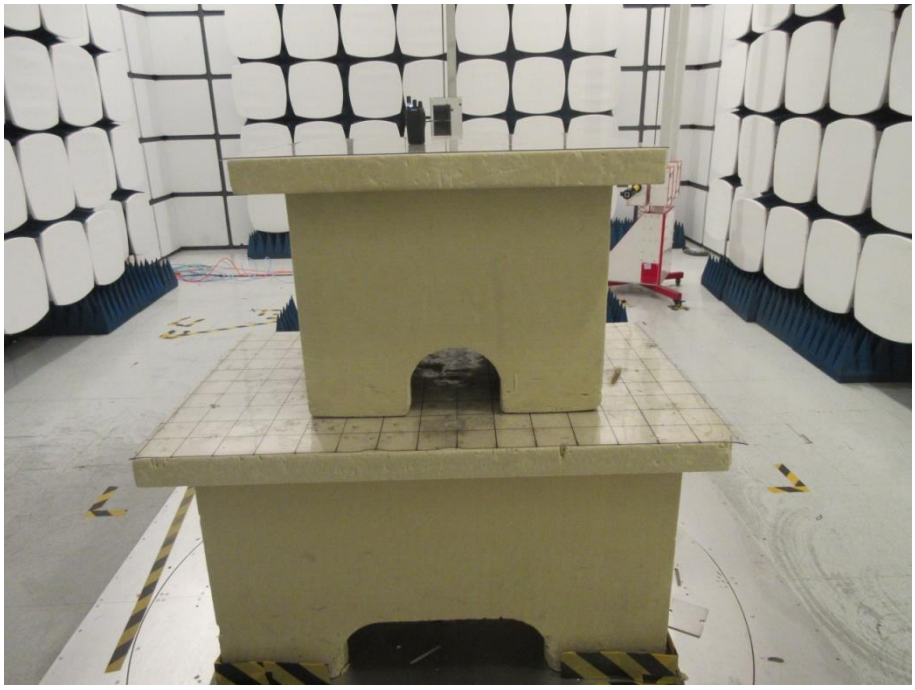
11. PHOTOS OF TEST SETUP

Radiated Measurement Photos

30MHz- 1GHz



Above 1GHz



※※※※※END OF THE REPORT※※※※※