FCC Part 90 Rules
Test Report

Report No.: AGC00589150303FE10

FCC ID	:	T4KD858
PRODUCT DESIGNATION	:	DIGITAL RADIO
BRAND NAME	:	N/A
MODEL NAME	:	D858, D878, D888, D898, 858, 878, 888, 898.
CLIENT	:	Qixiang Electron Science & Technology Co., Ltd
DATE OF ISSUE	:	May.24, 2015
STANDARD(S)	:	FCC Part 90 Rules
REPORT VERSION	:	V 1.0

*A*ttestation of *G*lobal *C*ompliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May.24, 2015	Valid	Original Report

VERIFICATION OF COMPLIANCE

Applicant:	Qixiang Electron Science & Technology Co., Ltd
	Qixiang Building,Tangxi Industrial Zone,Luojiang District,Quanzhou,Fujian,China
Manufacturer:	Qixiang Electron Science & Technology Co., Ltd
	Qixiang Building,Tangxi Industrial Zone,Luojiang District,Quanzhou,Fujian,China
Product Designation:	DIGITAL RADIO
Brand Name:	N/A
Test Model	D858
Series Model	D878, D888, D898, 858, 878, 888, 898
Difference description	All the same except for the model name and appearance shape.
Date of Test:	May.22, 2015 to May.23, 2015

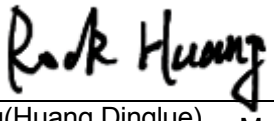
WE HEREBY CERTIFY THAT:

The above equipment was tested by Compliance Certification Services (Shenzhen) Inc. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA 603. The sample tested as described in this report is in compliance with the FCC Rules Part 90 requirements

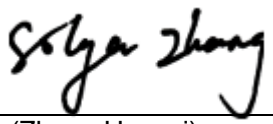
The test results of this report relate only to the tested sample identified in this report.

Tested by 

Steven Zhou(Zhou Pengyun) May.24,2015

Reviewed by 

Rock Huang(Huang Dinglue) May.24,2015

Approved by 

Solger Zhang(Zhang Hongyi) May.24,2015
Authorized Officer

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

The EUT is a **DIGITAL/ANALOG RADIO** designed for voice/data communication. It is designed by way of utilizing the FM/4FSK modulation achieves the system operating.
A major technical description of EUT is described as following:

Communication Type	Voice / Data
Modulation	FM/4FSK
Emission Type	11K0F3E, 7K60FXD, 7K60FXW
Emission Bandwidth	Analog:10.13KHz(5W),8.176 KHz(1W) Digital: 9.558KHz(5W),9.555 KHz(1W)
Peak Frequency Deviation	1.76KHz
Audio Frequency Response	10.93dB
Maximum Transmitter Power	Analog:36.87 dBm(5W), 29.94dBm (1W) Digital: 36.91 dBm(5W), 29.93dBm (1W)
Output power Modification	1W/5W (It was fixed by the manufacturer, any individual can't arbitrarily change it.)
Data Rate	9600bps/12.5KHz(Channel Spacing)
Antenna Designation	Detachable
Antenna Model	QA13U
Antenna Gain	2.15 dBi
Power Supply	DC 7.4V, 2000mAh (by battery)
Adapter Parameter	INPUT： 100V-240V , 50HZ , 0.3A OUTPUT：12V , 0.5A
Limiting Voltage	DC 6V-8.51V
Operation Frequency Range and Channel	Frequency Range: 400MHz to 480MHz (UHF) Channel Separation: 12.5KHz (Analog), 12.5KHz(Digital)
	Bottom Channel: 400.025MHz Middle Channel: 440.025MHz Top Channel: 479.975MHz
Frequency Tolerance	2.17ppm

Frequency Range (MHz)	Rated Transmit Power(W)(Conducted)	Transmit Mode/Emission Designator
400-480	1W/5W	11K0F3E(Analog Vioce;NB)
400-480	1W/5W	7K60FXD/7K60FXW(9600Data/Digital Voice NB)

Channel No. (6.25KHz)	Channel No. (12.5KHz)	12.5KHz Channel Spaced 400MHz Band Plan(MHz)
1	1-2	400.025
2		
3	3-4	440.025
4		
5	5-6	479.975
6		

FCC Rules and Regulations Part 2.202: Necessary Bandwidth and Emission Bandwidth
Voice –FM Analog (12.5KHz)
Calculation:
Max modulation (M) in kHz : 3.0
Max deviation(D) in kHz:2.5
Constant factor (K): 1(assumed)
Bn= 2XM +2XDK=11.0 KHz
Emission designator: 11K0F3E

9600 Digital Vioce/date (12.5KHz)
Calculation:
Data rate in bps(R)=9600
Deviation Peak deviation of carrier(D)=2359.585
Constant factor (K): 1 (default)
Bn= 3.86D+1.27RK= 3.86(2359.585)+0.27(9600)(1)=11.7KHz
Emission designator: 11K0FXD

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for FCC ID: T4KD858, filing to comply with the FCC Part 90 requirements.

1.3 TEST METHODOLOGY

The radiated emission testing was performed according to the procedures of TIA/EIA 603 and FCC CFR 47 Rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.

1.4 TEST FACILITY

Site	Compliance Certification Services(Shenzhen) Inc.
Location	Building 10-1, Mingkeda logistics park, huanguan South Road, guanlan town, Baoan District, Shenzhen, Guangdong, P.R.China
Description	The test site is constructed and calibrated to meet the FCC requirements in documents TIA/EIA 603.
FCC Registration No.	441872

1.5 SPECIAL ACCESSORIES

Not available for this EUT intended for grant.

1.6 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT EXERCISE

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 GENERAL TECHNICAL REQUIREMENTS

For FCC Part 90 requirements:
(1). Section 90.205: Maximum ERP is dependent upon the station's antenna HAAT and required service area
(2). Section 90.207: Modulation Characteristic
(3). Section 90.209: Occupied Bandwidth
(4). Section 90.210: Emission Mask
(5). Section 90.213: Frequency Tolerance
(6). Section 90.214: Transient Frequency Behavior

2.4 CONFIGURATION OF TESTED SYSTEM

Fig. 2-1 Configuration of Tested System

Table 2-1 Equipment Used in Tested System

Item	Equipment	Model No.	Identifier	Note
1	DIGITAL RADIO	D858	FCC ID:T4KD858	EUT

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§90.205	Maximum Transmitter Power	Compliant
§90.207	Modulation Characteristic	Compliant
§90.209	Occupied Bandwidth	Compliant
§90.210	Emission Mask	Compliant
§90.213	Frequency Tolerance	Compliant
§90.214	Transient Frequency Behavior	Compliant

LIST OF EQUIPMENTS USED

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	Cal. Date	Cal. Due
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	03/01/2015	03/01/2016
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	03/09/2015	03/08/2016
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2015	03/17/2016
High Noise Amplifier	Agilent	8449B	3008A01838	03/18/2015	03/17/2016
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	03/01/2015	02/28/2016
Bilog Antenna	SCHAFFNER	CBL6143	5082	03/01/2015	03/01/2016
Horn Antenna	SCHWARZBECK	BBHA9120	D286	03/01/2015	03/01/2016
WIDEBAND REQUENCY ANTENNA	SCHWARZBECK	VULB9168	N/A	03/01/2016	03/02/2017
ATTENUATOR	WEINSCHEL CORP	58-30-33	N/A	03/18/2015	03/17/2016
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/28/2015	02/27/2016
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Absorbing clamp	R&S	MDS-21	100668	10/27/2014	10/26/2015
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	03/09/2015	03/08/2016
Temp. / Humidity Meter	VICTOR	HTC-1	N/A	03/04/2015	03/03/2016
MODULATION ANALYZER	HP	8920B	3104A03367	07/30/2014	07/29/2015
SIGNAL GENERATOR	AGILENT	E4421B	122501288	07/25/2014	07/24/2015
SIGNAL GENERATOR	R&S	SMT03	A0304261	07/25/2014	07/24/2015
Conduction Cable	EM	C01	N/A	10/25/2014	10/24/2015
Clamp Cable	EM	C02	N/A	10/25/2014	10/24/2015

Note: 8920B can generate audio modulation frequency.

4. DESCRIPTION OF TEST MODES

RF TEST MODES

The EUT (DIGITAL RADIO) has been tested under normal operating condition. (The top channel, the middle channel and the bottom channel) are chosen for testing at each channel separation.

Analog:

No.	TEST MODES	CHANNEL SEPARATION
1	Low Channel	12.5 KHz
2	Middle Channel	12.5 KHz
3	High Channel	12.5 KHz

Digital:

No.	TEST MODES	CHANNEL SEPARATION
1	Low Channel	12.5 KHz
2	Middle Channel	12.5 KHz
3	High Channel	12.5 KHz

Note: Only the result of the worst case was recorded in the report.

5. FREQUENCY TOLERANCE

5.1 PROVISIONS APPLICABLE

a). 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.

b). According to FCC Part 2 Section 2.1055(d)(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 manufacturer.

c). According to FCC Part 90 Section 90.213, the frequency tolerance must be maintained within 0.00025% for 12.5 KHz channel separation and 0.0001% for 6.25 KHz channel separation.

5.2 MEASUREMENT PROCEDURE

5.2.1 Frequency stability versus environmental temperature

1. Setup the configuration per figure 1 for frequencies measurement inside an environment chamber, Install new battery in the EUT.
2. Turn on EUT and set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1KHz and Video Resolution Bandwidth to 1KHz and Frequency Span to 50KHz.Record this frequency as reference frequency.
3. Set the temperature of chamber to 50℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.
4. Repeat step 2 with a 10℃ decreased per stage until the lowest temperature -30℃ is measured, record all measured frequencies on each temperature step.

5.2.2 Frequency stability versus input voltage

1. Setup the configuration per figure 1 for frequencies measured at temperature if it is within 15℃ to 25℃. Otherwise, an environment chamber set for a temperature of 20℃ shall be used. The EUT shall be powered by DC 7.4V.
2. Set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1 KHz and Video Resolution Bandwidth to 1KHz. Record this frequency as reference frequency.
3. Supply the EUT primary voltage at the operating end point which is specified by manufacturer and record the frequency.

5.3 TEST SETUP BLOCK DIAGRAM

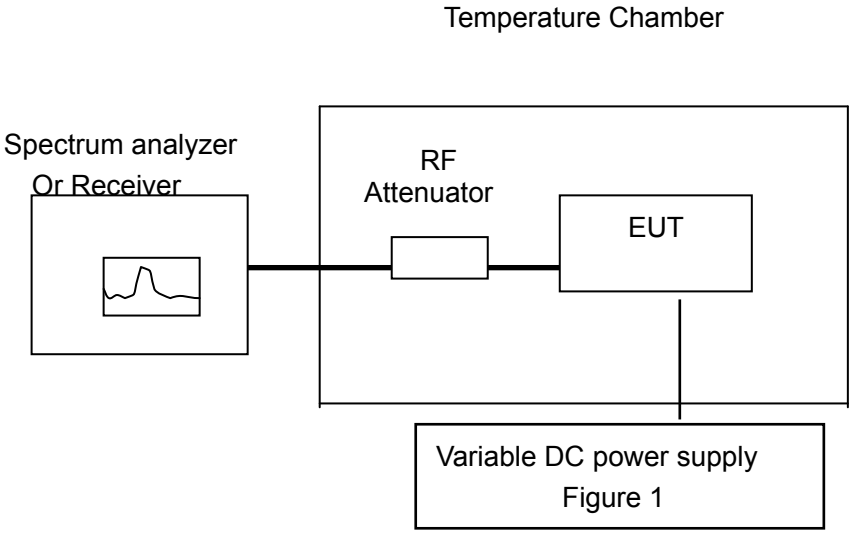


Figure 1

5.4 TEST RESULT

Analog:

(1) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)**-5W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	400.025368	0.920
40	DC 7.40 V	400.025454	1.135
30	DC 7.40 V	400.025342	0.855
20	DC 7.40 V	400.025165	0.412
10	DC 7.40 V	400.025578	1.445
0	DC 7.40 V	400.025334	0.835
-10	DC 7.40 V	400.025223	0.557
-20	DC 7.40 V	400.025485	1.212
-30	DC 7.40 V	400.025718	1.795

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	440.025256	0.582
40	DC 7.40 V	440.025154	0.350
30	DC 7.40 V	440.025434	0.986
20	DC 7.40 V	440.025358	0.814
10	DC 7.40 V	440.025076	0.173
0	DC 7.40 V	440.025178	0.405
-10	DC 7.40 V	440.025234	0.532
-20	DC 7.40 V	440.025382	0.868
-30	DC 7.40 V	440.02573	1.659

Top Channel @ 12.5 KHz Channel Separation

Reference Frequency:	479.975 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	479.975272	0.567
40	DC 7.40 V	479.975383	0.798
30	DC 7.40 V	479.975465	0.969
20	DC 7.40 V	479.975455	0.948
10	DC 7.40 V	479.975764	1.592
0	DC 7.40 V	479.975162	0.338
-10	DC 7.40 V	479.975387	0.806
-20	DC 7.40 V	479.975178	0.371
-30	DC 7.40 V	479.975267	0.556

(2) Frequency stability versus input voltage (Battery limiting voltage is 6.29V) **-5W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	400.025169	0.422
40	DC 6.29 V	400.025354	0.885
30	DC 6.29 V	400.025432	1.080
20	DC 6.29 V	400.025583	1.457
10	DC 6.29 V	400.025376	0.940
0	DC 6.29 V	400.025123	0.307
-10	DC 6.29 V	400.025178	0.445
-20	DC 6.29 V	400.025365	0.912
-30	DC 6.29 V	400.025868	2.170

Middle Channel @ 12.5 KHz Channel Separation

Reference Frequency:	440.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	440.025282	0.641
40	DC 6.29 V	440.025375	0.852
30	DC 6.29 V	440.025643	1.461
20	DC 6.29 V	440.025186	0.423
10	DC 6.29 V	440.025323	0.734
0	DC 6.29 V	440.025278	0.632
-10	DC 6.29 V	440.025221	0.502
-20	DC 6.29 V	440.025124	0.282
-30	DC 6.29 V	440.025359	0.816

Top Channel @ 12.5 KHz Channel Separation

Reference Frequency:	479.975 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	479.975238	0.496
40	DC 6.29 V	479.975268	0.558
30	DC 6.29 V	479.975156	0.325
20	DC 6.29 V	479.975089	0.185
10	DC 6.29 V	479.975331	0.690
0	DC 6.29 V	479.975123	0.256
-10	DC 6.29 V	479.975478	0.996
-20	DC 6.29 V	479.975163	0.340
-30	DC 6.29 V	479.975259	0.540

(3) Frequency stability versus input voltage (Battery Fully Charged voltage is 8.51V) **-5W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	400.025275	0.687
40	DC 8.51 V	400.025061	0.152
30	DC 8.51 V	400.025042	0.105
20	DC 8.51 V	400.025266	0.665
10	DC 8.51 V	400.025078	0.195
0	DC 8.51 V	400.025333	0.832
-10	DC 8.51 V	400.025074	0.185
-20	DC 8.51 V	400.025189	0.472
-30	DC 8.51 V	400.025212	0.530

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	440.025278	0.632
40	DC 8.51 V	440.025336	0.764
30	DC 8.51 V	440.025655	1.489
20	DC 8.51 V	440.025465	1.057
10	DC 8.51 V	440.025323	0.734
0	DC 8.51 V	440.025154	0.350
-10	DC 8.51 V	440.025241	0.548
-20	DC 8.51 V	440.025083	0.189
-30	DC 8.51 V	440.025144	0.327

Top Channel @ 12.5 KHz Channel Separation

Reference Freque	479.975 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	479.975675	1.406
40	DC 8.51 V	479.975163	0.340
30	DC 8.51 V	479.975345	0.719
20	DC 8.51 V	479.975436	0.908
10	DC 8.51 V	479.975052	0.108
0	DC 8.51 V	479.975337	0.702
-10	DC 8.51 V	479.975257	0.535
-20	DC 8.51 V	479.975062	0.129
-30	DC 8.51 V	479.975123	0.256

(4) Frequency stability versus input voltage (Battery endpoint is 6V) **-5W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	400.025169	0.422
40	DC 6.29 V	400.025354	0.885
30	DC 6.29 V	400.025432	1.080
20	DC 6.29 V	400.025583	1.457
10	DC 6.29 V	400.025376	0.940
0	DC 6.29 V	400.025123	0.307
-10	DC 6.29 V	400.025178	0.445
-20	DC 6.29 V	400.025365	0.912
-30	DC 6.29 V	400.025868	2.170

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	440.025282	0.641
40	DC 6.29 V	440.025375	0.852
30	DC 6.29 V	440.025643	1.461
20	DC 6.29 V	440.025186	0.423
10	DC 6.29 V	440.025323	0.734
0	DC 6.29 V	440.025278	0.632
-10	DC 6.29 V	440.025221	0.502
-20	DC 6.29 V	440.025124	0.282
-30	DC 6.29 V	440.025359	0.816

Top Channel @ 12.5 KHz Channel Separation

Reference Freque	479.975 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	479.975238	0.496
40	DC 6.29 V	479.975268	0.558
30	DC 6.29 V	479.975156	0.325
20	DC 6.29 V	479.975089	0.185
10	DC 6.29 V	479.975331	0.690
0	DC 6.29 V	479.975123	0.256
-10	DC 6.29 V	479.975478	0.996
-20	DC 6.29 V	479.975163	0.340
-30	DC 6.29 V	479.975259	0.540

(1) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)**-1W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	400.025282	0.705
40	DC 7.40 V	400.025304	0.760
30	DC 7.40 V	400.025153	0.382
20	DC 7.40 V	400.025327	0.817
10	DC 7.40 V	400.025207	0.517
0	DC 7.40 V	400.025273	0.682
-10	DC 7.40 V	400.025163	0.407
-20	DC 7.40 V	400.025169	0.422
-30	DC 7.40 V	400.025227	0.567

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	440.025314	0.714
40	DC 7.40 V	440.025217	0.493
30	DC 7.40 V	440.025269	0.611
20	DC 7.40 V	440.025362	0.823
10	DC 7.40 V	440.025236	0.536
0	DC 7.40 V	440.025196	0.443
-10	DC 7.40 V	440.025253	0.575
-20	DC 7.40 V	440.025263	0.609
-30	DC 7.40 V	440.025406	0.923

Top Channel @ 12.5 KHz Channel Separation

Reference Frequency:	479.975 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	479.975228	0.475
40	DC 7.40 V	479.975324	0.675
30	DC 7.40 V	479.975164	0.342
20	DC 7.40 V	479.975328	0.683
10	DC 7.40 V	479.975268	0.558
0	DC 7.40 V	479.975291	0.606
-10	DC 7.40 V	479.975185	0.385
-20	DC 7.40 V	479.975201	0.419
-30	DC 7.40 V	479.975327	0.681

(2) Frequency stability versus input voltage (Battery limiting voltage is 6.29V) **-1W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	400.025257	0.642
40	DC 6.29 V	400.025363	0.907
30	DC 6.29 V	400.025342	0.855
20	DC 6.29 V	400.025251	0.627
10	DC 6.29 V	400.025108	0.270
0	DC 6.29 V	400.025153	0.382
-10	DC 6.29 V	400.025169	0.422
-20	DC 6.29 V	400.025268	0.670
-30	DC 6.29 V	400.025406	1.015

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 M	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	440.025323	0.724
40	DC 6.29 V	440.025356	0.809
30	DC 6.29 V	440.025294	0.668
20	DC 6.29 V	440.025274	0.623
10	DC 6.29 V	440.025368	0.836
0	DC 6.29 V	440.025249	0.566
-10	DC 6.29 V	440.025157	0.357
-20	DC 6.29 V	440.025269	0.611
-30	DC 6.29 V	440.025285	0.648

Top Channel @ 12.5 KHz Channel Separation

Reference Frequency:	479.975 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	479.975345	0.719
40	DC 6.29 V	479.975267	0.556
30	DC 6.29 V	479.975158	0.329
20	DC 6.29 V	479.975096	0.200
10	DC 6.29 V	479.975264	0.550
0	DC 6.29 V	479.975273	0.569
-10	DC 6.29 V	479.975182	0.379
-20	DC 6.29 V	479.975124	0.258
-30	DC 6.29 V	479.975275	0.573

(3) Frequency stability versus input voltage (Battery Fully Charged voltage is 8.51V) **-1W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	400.025305	0.762
40	DC 8.51 V	400.025257	0.642
30	DC 8.51 V	400.025324	0.810
20	DC 8.51 V	400.025167	0.417
10	DC 8.51 V	400.025261	0.652
0	DC 8.51 V	400.025194	0.485
-10	DC 8.51 V	400.025264	0.660
-20	DC 8.51 V	400.025235	0.587
-30	DC 8.51 V	400.025163	0.407

Middle Channel @ 12.5 KHz Channel Separation

Reference Frequency:	440.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	440.025314	0.714
40	DC 8.51 V	440.025259	0.589
30	DC 8.51 V	440.025248	0.564
20	DC 8.51 V	440.025473	1.075
10	DC 8.51 V	440.025138	0.314
0	DC 8.51 V	440.025181	0.411
-10	DC 8.51 V	440.025437	0.993
-20	DC 8.51 V	440.025192	0.436
-30	DC 8.51 V	440.025342	0.777

Top Channel @ 12.5 KHz Channel Separation

Reference Freque	479.975 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	479.975251	0.523
40	DC 8.51 V	479.975305	0.635
30	DC 8.51 V	479.975292	0.608
20	DC 8.51 V	479.975245	0.510
10	DC 8.51 V	479.975163	0.340
0	DC 8.51 V	479.975258	0.538
-10	DC 8.51 V	479.975307	0.640
-20	DC 8.51 V	479.975093	0.194
-30	DC 8.51 V	479.975175	0.365

(4) Frequency stability versus input voltage (Battery endpoint is 6V) **-1W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	400.025247	0.617
40	DC 6.29 V	400.025268	0.670
30	DC 6.29 V	400.025361	0.902
20	DC 6.29 V	400.025426	1.065
10	DC 6.29 V	400.025324	0.810
0	DC 6.29 V	400.025352	0.880
-10	DC 6.29 V	400.025391	0.977
-20	DC 6.29 V	400.025372	0.930
-30	DC 6.29 V	400.025269	0.672

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	440.025265	0.602
40	DC 6.29 V	440.025247	0.561
30	DC 6.29 V	440.025362	0.823
20	DC 6.29 V	440.025194	0.441
10	DC 6.29 V	440.025206	0.468
0	DC 6.29 V	440.025317	0.720
-10	DC 6.29 V	440.025251	0.570
-20	DC 6.29 V	440.025322	0.732
-30	DC 6.29 V	440.025343	0.780

Top Channel @ 12.5 KHz Channel Separation

Reference Frequency:	479.975 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	479.975437	0.910
40	DC 6.29 V	479.975261	0.544
30	DC 6.29 V	479.975298	0.621
20	DC 6.29 V	479.975127	0.265
10	DC 6.29 V	479.975263	0.548
0	DC 6.29 V	479.975162	0.338
-10	DC 6.29 V	479.975351	0.731
-20	DC 6.29 V	479.975327	0.681
-30	DC 6.29 V	479.975284	0.592

Digital:

(1) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)**-5W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	400.025317	0.792
40	DC 7.40 V	400.025226	0.565
30	DC 7.40 V	400.025475	1.187
20	DC 7.40 V	400.025363	0.907
10	DC 7.40 V	400.025115	0.287
0	DC 7.40 V	400.025426	1.065
-10	DC 7.40 V	400.025337	0.842
-20	DC 7.40 V	400.025448	1.120
-30	DC 7.40 V	400.025219	0.547

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 M	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	440.025147	0.334
40	DC 7.40 V	440.025416	0.945
30	DC 7.40 V	440.025335	0.761
20	DC 7.40 V	440.025153	0.348
10	DC 7.40 V	440.025074	0.168
0	DC 7.40 V	440.025125	0.284
-10	DC 7.40 V	440.025096	0.218
-20	DC 7.40 V	440.025337	0.766
-30	DC 7.40 V	440.025249	0.566

Top Channel @ 12.5 KHz Channel Separation

Reference Freque	479.975 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	479.975238	0.496
40	DC 7.40 V	479.975126	0.263
30	DC 7.40 V	479.975375	0.781
20	DC 7.40 V	479.975313	0.652
10	DC 7.40 V	479.975055	0.115
0	DC 7.40 V	479.975135	0.281
-10	DC 7.40 V	479.975097	0.202
-20	DC 7.40 V	479.975078	0.163
-30	DC 7.40 V	479.975269	0.560

(2) Frequency stability versus input voltage (Battery limiting voltage is 6.29V) **-5W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	400.025228	0.570
40	DC 6.29 V	400.025188	0.470
30	DC 6.29 V	400.025045	0.112
20	DC 6.29 V	400.025264	0.660
10	DC 6.29 V	400.025016	0.040
0	DC 6.29 V	400.025089	0.222
-10	DC 6.29 V	400.025058	0.145
-20	DC 6.29 V	400.025069	0.172
-30	DC 6.29 V	400.025153	0.382

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 M	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	440.025235	0.534
40	DC 6.29 V	440.025187	0.425
30	DC 6.29 V	440.025045	0.102
20	DC 6.29 V	440.025263	0.598
10	DC 6.29 V	440.025176	0.400
0	DC 6.29 V	440.025325	0.739
-10	DC 6.29 V	440.025184	0.418
-20	DC 6.29 V	440.025169	0.384
-30	DC 6.29 V	440.025312	0.709

Top Channel @ 12.5 KHz Channel Separation

Reference Frequency:	479.975 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	479.975382	0.796
40	DC 6.29 V	479.975217	0.452
30	DC 6.29 V	479.975146	0.304
20	DC 6.29 V	479.975155	0.323
10	DC 6.29 V	479.975378	0.788
0	DC 6.29 V	479.975136	0.283
-10	DC 6.29 V	479.975242	0.504
-20	DC 6.29 V	479.975128	0.267
-30	DC 6.29 V	479.975111	0.231

(3) Frequency stability versus input voltage (Battery Fully Charged voltage is 8.51V) **-5W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	400.025267	0.667
40	DC 8.51 V	400.025153	0.382
30	DC 8.51 V	400.025196	0.490
20	DC 8.51 V	400.025327	0.817
10	DC 8.51 V	400.025344	0.860
0	DC 8.51 V	400.025263	0.657
-10	DC 8.51 V	400.025187	0.467
-20	DC 8.51 V	400.025157	0.392
-30	DC 8.51 V	400.025123	0.307

Middle Channel @ 12.5 KHz Channel Separation

Reference Frequency:	440.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	440.025228	0.518
40	DC 8.51 V	440.025156	0.355
30	DC 8.51 V	440.025378	0.859
20	DC 8.51 V	440.025163	0.370
10	DC 8.51 V	440.025254	0.577
0	DC 8.51 V	440.025327	0.743
-10	DC 8.51 V	440.025166	0.377
-20	DC 8.51 V	440.025058	0.132
-30	DC 8.51 V	440.025108	0.245

Top Channel @ 12.5 KHz Channel Separation

Reference Frequency:	479.975 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	479.975122	0.254
40	DC 8.51 V	479.975269	0.560
30	DC 8.51 V	479.975357	0.744
20	DC 8.51 V	479.975126	0.263
10	DC 8.51 V	479.975353	0.735
0	DC 8.51 V	479.975578	1.204
-10	DC 8.51 V	479.975496	1.033
-20	DC 8.51 V	479.975282	0.588
-30	DC 8.51 V	479.975127	0.265

(4) Frequency stability versus input voltage(Battery endpoint is 6V) **-5W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	400.025228	0.570
40	DC 6.29 V	400.025188	0.470
30	DC 6.29 V	400.025045	0.112
20	DC 6.29 V	400.025264	0.660
10	DC 6.29 V	400.025016	0.040
0	DC 6.29 V	400.025089	0.222
-10	DC 6.29 V	400.025058	0.145
-20	DC 6.29 V	400.025069	0.172
-30	DC 6.29 V	400.025153	0.382

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 M	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	440.025235	0.534
40	DC 6.29 V	440.025187	0.425
30	DC 6.29 V	440.025045	0.102
20	DC 6.29 V	440.025263	0.598
10	DC 6.29 V	440.025176	0.400
0	DC 6.29 V	440.025325	0.739
-10	DC 6.29 V	440.025184	0.418
-20	DC 6.29 V	440.025169	0.384
-30	DC 6.29 V	440.025312	0.709

Top Channel @ 12.5 KHz Channel Separation

Reference Freque	479.975 M	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	479.975382	0.796
40	DC 6.29 V	479.975217	0.452
30	DC 6.29 V	479.975146	0.304
20	DC 6.29 V	479.975155	0.323
10	DC 6.29 V	479.975378	0.788
0	DC 6.29 V	479.975136	0.283
-10	DC 6.29 V	479.975242	0.504
-20	DC 6.29 V	479.975128	0.267
-30	DC 6.29 V	479.975111	0.231

(1) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)**-1W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	400.025238	0.595
40	DC 7.40 V	400.025261	0.652
30	DC 7.40 V	400.025347	0.867
20	DC 7.40 V	400.025359	0.897
10	DC 7.40 V	400.025264	0.660
0	DC 7.40 V	400.025138	0.345
-10	DC 7.40 V	400.025316	0.790
-20	DC 7.40 V	400.025328	0.820
-30	DC 7.40 V	400.025179	0.447

Middle Channel @ 12.5 KHz Channel Separation

Reference Frequency:	440.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	440.025246	0.559
40	DC 7.40 V	440.025258	0.586
30	DC 7.40 V	440.025291	0.661
20	DC 7.40 V	440.025242	0.550
10	DC 7.40 V	440.025135	0.307
0	DC 7.40 V	440.025159	0.361
-10	DC 7.40 V	440.025182	0.414
-20	DC 7.40 V	440.025149	0.339
-30	DC 7.40 V	440.025176	0.400

Top Channel @ 12.5 KHz Channel Separation

Reference Freque	479.975 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 7.40 V	479.975231	0.481
40	DC 7.40 V	479.975153	0.319
30	DC 7.40 V	479.975238	0.496
20	DC 7.40 V	479.975194	0.404
10	DC 7.40 V	479.975165	0.344
0	DC 7.40 V	479.975182	0.379
-10	DC 7.40 V	479.975265	0.552
-20	DC 7.40 V	479.975247	0.515
-30	DC 7.40 V	479.975292	0.608

(2) Frequency stability versus input voltage (Battery limiting voltage is 6.29V) **-1W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	400.025292	0.730
40	DC 6.29 V	400.025267	0.667
30	DC 6.29 V	400.025083	0.207
20	DC 6.29 V	400.025164	0.410
10	DC 6.29 V	400.025095	0.237
0	DC 6.29 V	400.025269	0.672
-10	DC 6.29 V	400.025289	0.722
-20	DC 6.29 V	400.025318	0.795
-30	DC 6.29 V	400.025264	0.660

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	440.025268	0.609
40	DC 6.29 V	440.025311	0.707
30	DC 6.29 V	440.025265	0.602
20	DC 6.29 V	440.025292	0.664
10	DC 6.29 V	440.025182	0.414
0	DC 6.29 V	440.025216	0.491
-10	DC 6.29 V	440.025203	0.461
-20	DC 6.29 V	440.025244	0.555
-30	DC 6.29 V	440.025269	0.611

Top Channel @ 12.5 KHz Channel Separation

Reference Frequency:	479.975 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	479.975295	0.615
40	DC 6.29 V	479.975273	0.569
30	DC 6.29 V	479.975278	0.579
20	DC 6.29 V	479.975296	0.617
10	DC 6.29 V	479.975309	0.644
0	DC 6.29 V	479.975165	0.344
-10	DC 6.29 V	479.975208	0.433
-20	DC 6.29 V	479.975351	0.731
-30	DC 6.29 V	479.975195	0.406

(3) Frequency stability versus input voltage (Battery Fully Charged voltage is 8.51V) **-1W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	400.025317	0.792
40	DC 8.51 V	400.025283	0.707
30	DC 8.51 V	400.025219	0.547
20	DC 8.51 V	400.025246	0.615
10	DC 8.51 V	400.025261	0.652
0	DC 8.51 V	400.025232	0.580
-10	DC 8.51 V	400.025152	0.380
-20	DC 8.51 V	400.025215	0.537
-30	DC 8.51 V	400.025241	0.602

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	440.025193	0.439
40	DC 8.51 V	440.025127	0.289
30	DC 8.51 V	440.025158	0.359
20	DC 8.51 V	440.025194	0.441
10	DC 8.51 V	440.025211	0.480
0	DC 8.51 V	440.025216	0.491
-10	DC 8.51 V	440.025172	0.391
-20	DC 8.51 V	440.025235	0.534
-30	DC 8.51 V	440.025243	0.554

Top Channel @ 12.5 KHz Channel Separation

Reference Freque	479.975 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 8.51 V	479.975215	0.448
40	DC 8.51 V	479.975239	0.498
30	DC 8.51 V	479.975357	0.744
20	DC 8.51 V	479.975318	0.663
10	DC 8.51 V	479.975349	0.727
0	DC 8.51 V	479.975242	0.504
-10	DC 8.51 V	479.975328	0.683
-20	DC 8.51 V	479.975341	0.710
-30	DC 8.51 V	479.975203	0.423

(4) Frequency stability versus input voltage (Battery endpoint is 6V) **-1W**

Bottom Channel @ 12.5 KHz Channel Separation

Reference Frequency:	400.025 MHz	Limit:	2.5ppm
Envionment Temperature	Power Supply	Frequency Deviation	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	400.025216	0.540
40	DC 6.29 V	400.025157	0.392
30	DC 6.29 V	400.025128	0.320
20	DC 6.29 V	400.025224	0.560
10	DC 6.29 V	400.025164	0.410
0	DC 6.29 V	400.025179	0.447
-10	DC 6.29 V	400.025183	0.457
-20	DC 6.29 V	400.025242	0.605
-30	DC 6.29 V	400.025314	0.785

Middle Channel @ 12.5 KHz Channel Separation

Reference Freque	440.025 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	440.025353	0.802
40	DC 6.29 V	440.025152	0.345
30	DC 6.29 V	440.025165	0.375
20	DC 6.29 V	440.025248	0.564
10	DC 6.29 V	440.025194	0.441
0	DC 6.29 V	440.025235	0.534
-10	DC 6.29 V	440.025116	0.264
-20	DC 6.29 V	440.025154	0.350
-30	DC 6.29 V	440.025183	0.416

Top Channel @ 12.5 KHz Channel Separation

Reference Freque	479.975 MHz	Limit:	2.5ppm
Envionment Tempe	Power Supply	Frequency Deviatio	
(℃)	(V)	(MHz)	ppm
50	DC 6.29 V	479.975249	0.519
40	DC 6.29 V	479.975282	0.588
30	DC 6.29 V	479.975164	0.342
20	DC 6.29 V	479.975186	0.388
10	DC 6.29 V	479.975244	0.508
0	DC 6.29 V	479.975316	0.658
-10	DC 6.29 V	479.975284	0.592
-20	DC 6.29 V	479.975308	0.642
-30	DC 6.29 V	479.975352	0.733

6. EMISSION BANDWIDTH

6.1 PROVISIONS APPLICABLE

According to FCC Part 90 Section 90.209:The authorized bandwidth shall be 11.25 KHz for 12.5 KHz channel separation and 6 KHz for 6.25 KHz channel separation.

6.2 MEASUREMENT PROCEDURE

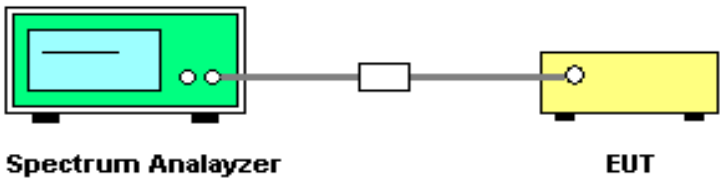
1). The EUT was placed on a turn table which is 0.8m above ground plane.

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

3). Set SPA Center Frequency = fundamental frequency, RBW=100Hz.VBW= 300 Hz, Span =50 KHz.

4). Set SPA Max hold. Mark peak, -26 dB.

6.3 TEST SETUP BLOCK DIAGRAM

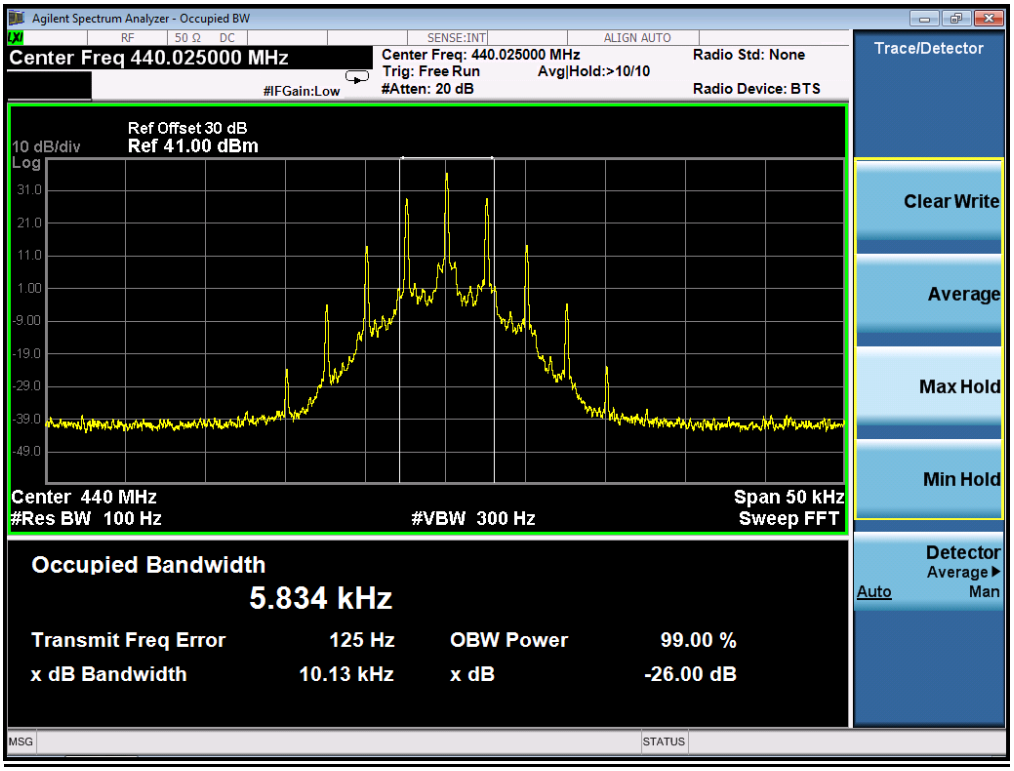


6.4 MEASUREMENT RESULT

Analog:

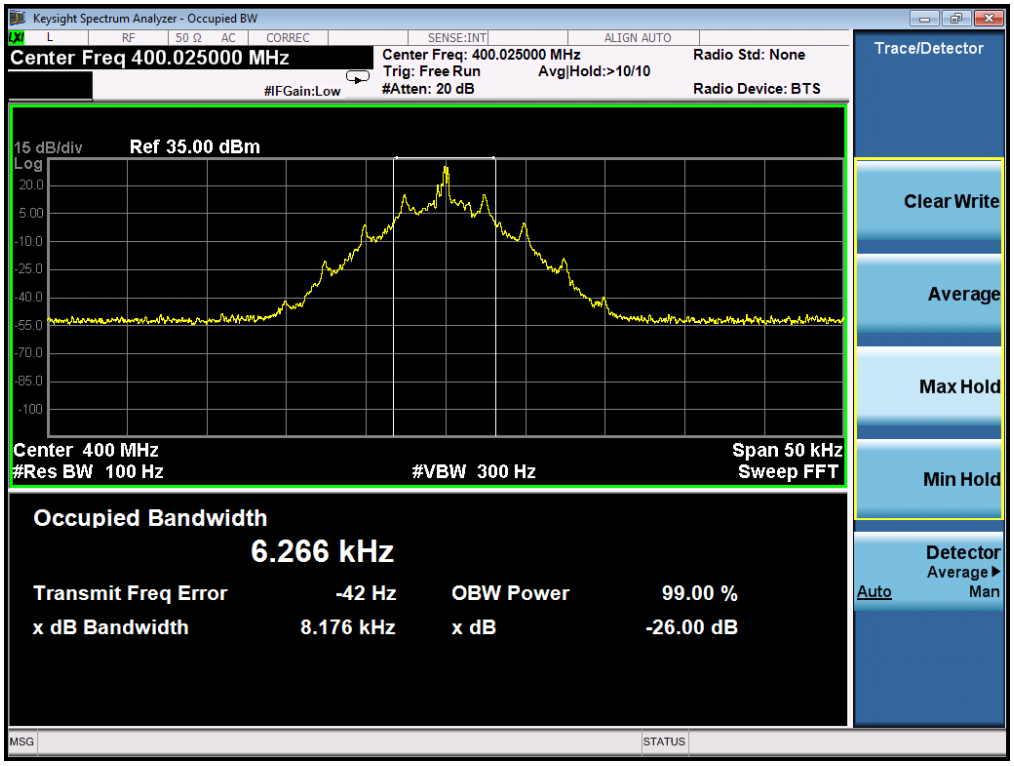
26 DB BANDWIDTH MEASUREMENT RESULT			
Operating Frequency	12.5 KHz Channel Separation		
	Test Data	Limits	Result
400.025MHz	10.10KHz	11.25 KHz	Pass
440.025MHz	10.13KHz	11.25 KHz	Pass
479.975MHz	10.08KHz	11.25 KHz	Pass

Occupied bandwidth of Middle Channel (Maximum)-5W



26 DB BANDWIDTH MEASUREMENT RESULT			
Operating Frequency	12.5 KHz Channel Separation		
	Test Data	Limits	Result
400.025MHz	8.176KHz	11.25 KHz	Pass
440.025MHz	8.145KHz	11.25 KHz	Pass
479.975MHz	8.165KHz	11.25 KHz	Pass

Occupied bandwidth of Bottom Channel (Maximum)-1W

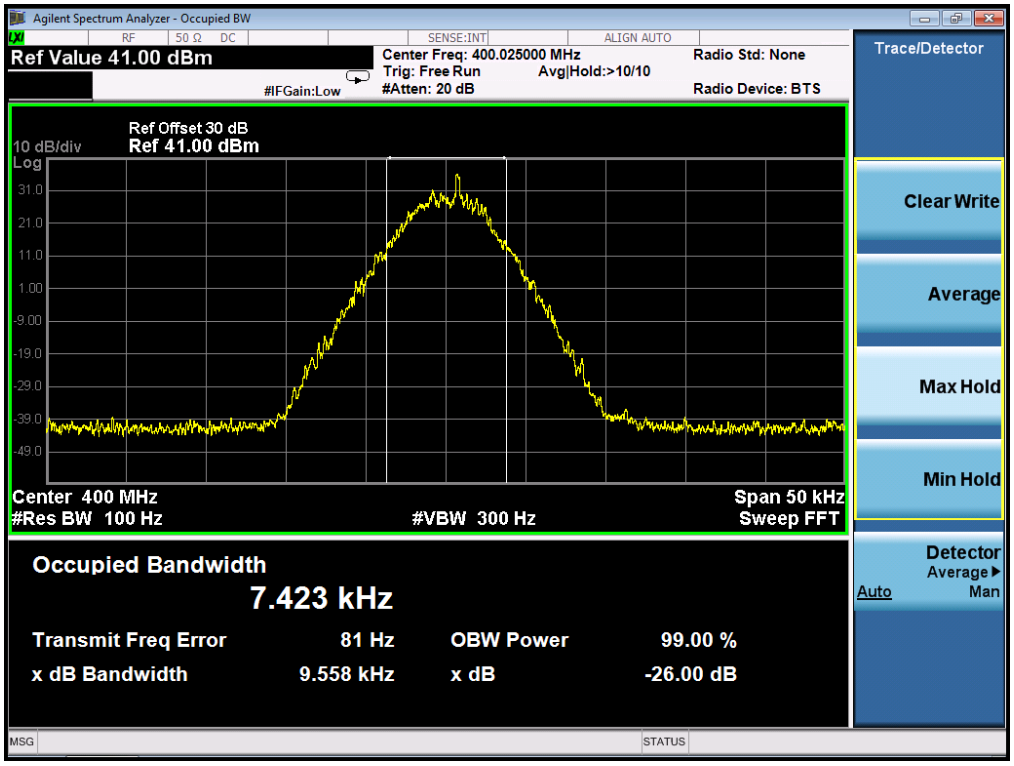


Digital:

TEST RESULTS

26 DB BANDWIDTH MEASUREMENT RESULT			
Operating Frequency	12.5 KHz Channel Separation		
	Test Data	Limits	Result
400.025MHz	9.558KHz	11.25 KHz	Pass
440.025MHz	9.553KHz	11.25 KHz	Pass
479.975MHz	9.551KHz	11.25 KHz	Pass

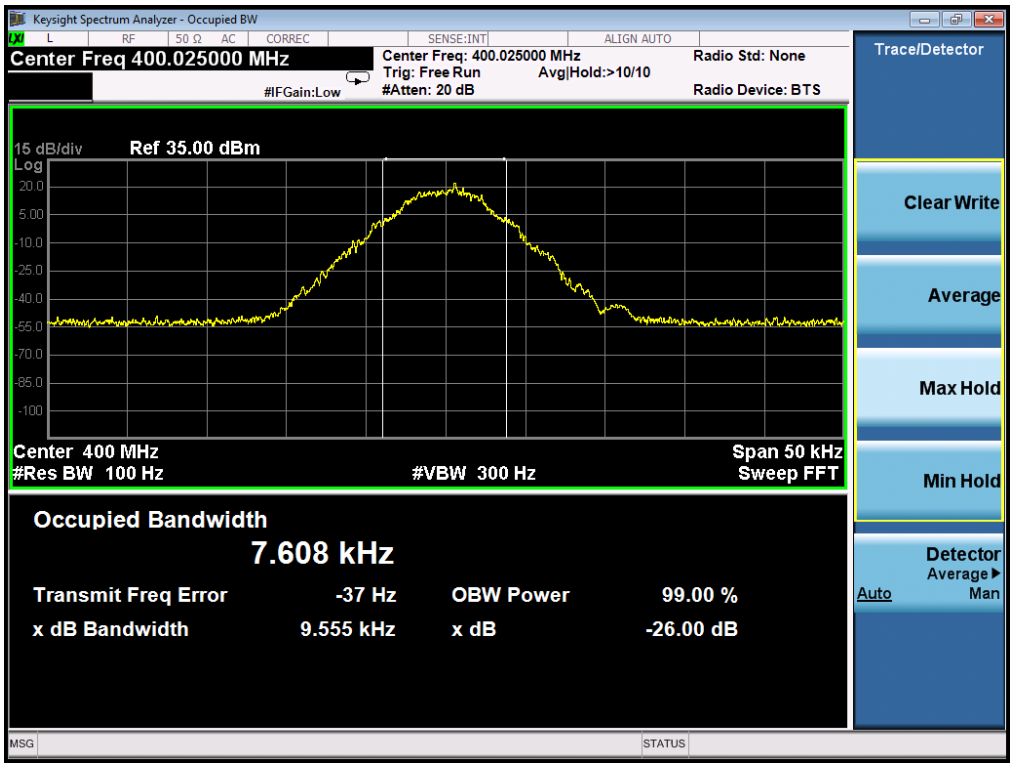
Occupied bandwidth of Bottom Channel (Maximum) -5W



TEST RESULTS

26 DB BANDWIDTH MEASUREMENT RESULT			
Operating Frequency	12.5 KHz Channel Separation		
	Test Data	Limits	Result
400.025MHz	9.555KHz	11.25 KHz	Pass
440.025MHz	9.548KHz	11.25 KHz	Pass
479.975MHz	9.551KHz	11.25 KHz	Pass

Occupied bandwidth of Bottom Channel (Maximum) -1W



7. UNWANTED RADIATION

7.1 PROVISIONS APPLICABLE

8.1.1 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 each channel separation.

For 12.5 KHz Channel Separation:

(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 7.27(fd-2.88 KHz) dB

(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 6.25 KHz Channel Separation:

(1).On any frequency from the center of the authorized bandwidth fo to 3.0 kHz removed from fo: Zero dB.

(2).On any frequency removed from the center of the authorized bandwidth by a displacement f requency (fd in kHz) of more than 3.0 kHz but no more than 4.6 kHz: At least 30 + 16.67(fd´3 kHz) or 55 + 10 log (P) or 65 dB, whichever is the lesser attenuation.

(3).On any frequency removed from the center of the authorized bandwidth by more than 4.6 kHz: At least 55 + 10log (P) or 65 dB, whichever is the lesser attenuation.

7.2 MEASUREMENT PROCEDURE

(1)On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.

(2)The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.

(3)The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.

(4)The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.

(5)The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.

(6)The transmitter shall than be rotated through 360°in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

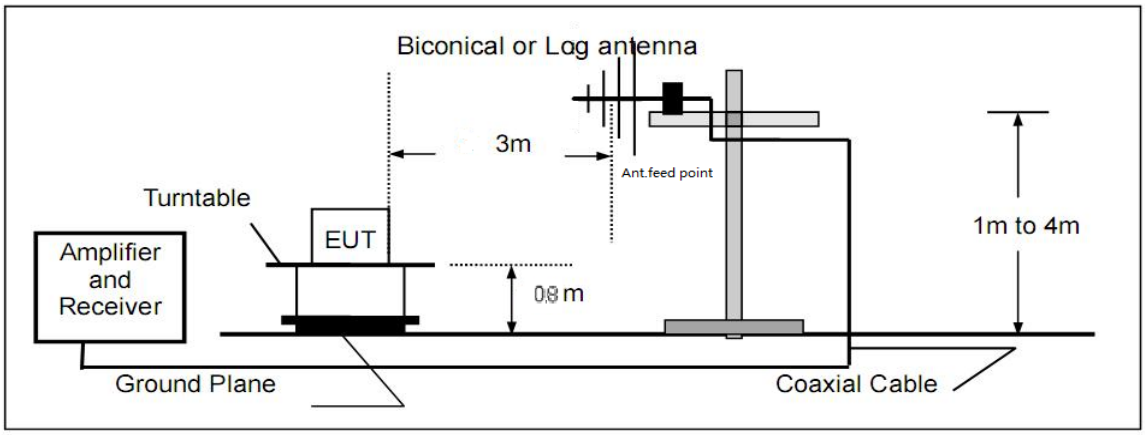
(7)The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.

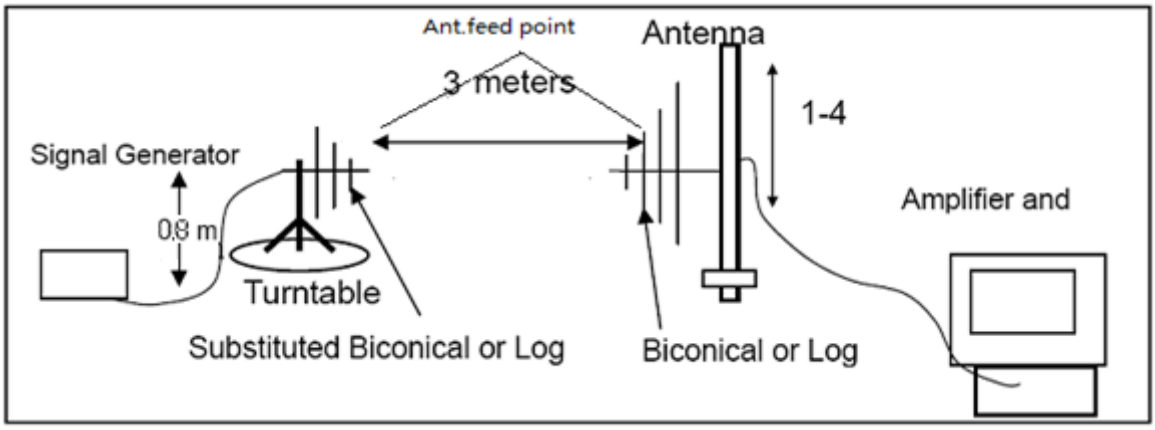
(8)The maximum signal level detected by the measuring receiver shall be noted.
(9)The measurement shall be repeated with the test antenna set to horizontal polarization.
(10) Replace the antenna with a proper Antenna (substitution antenna).
(11)The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
(12)The substitution antenna shall be connected to a calibrated signal generator.
(13)If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
(14)The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
(15)The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
(16)The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
(17)The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

7.3 TEST SETUP BLOCK DIAGRAM

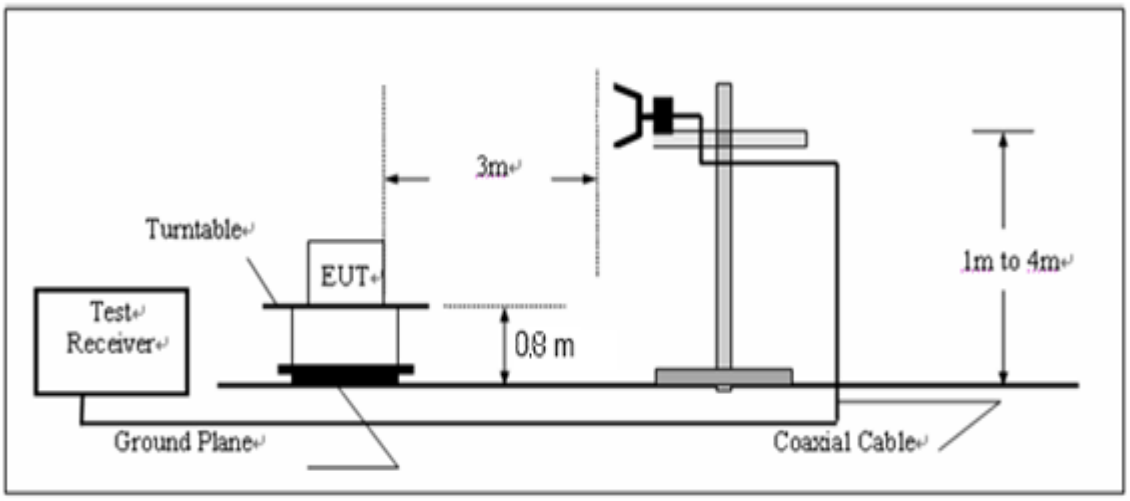
SUBSTITUTION METHOD: (Radiated Emissions)

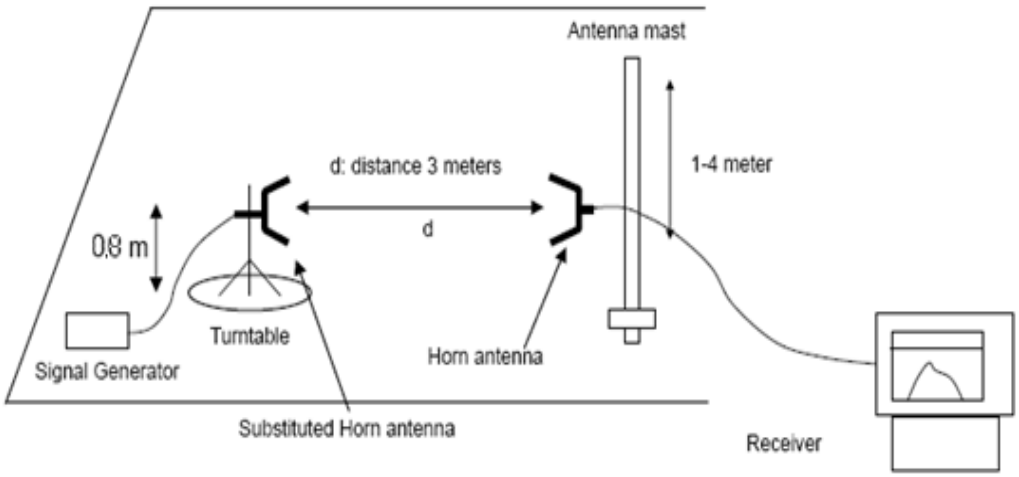
Radiated Below1GHz





Radiated Above 1 GHz





7.4 MEASUREMENT RESULTS:

Measurement Result for 12.5 KHz Channel Separation

On any frequency removed from the center of the authorized bandwidth by a displacement Frequency (fd in KHz)for of more than 12.5 KHz: at least 50+10 log(P) dB or 70 dB, whichever is lesser attenuation.

Limit: At least 50+10 log (P) =50+10log (5) =57 (dB)—5W
At least 50+10 log (P) =50+10log (1) =50 (dB)—1W

Analog:

TEST RESULTS--5W

Measurement Result for 12.5 KHz Channel Separation @ 400.025MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
400.025	H	0		pass
800.050	H	86.19	57	pass
1200.075	H	71.76	57	pass
1600.100	H	94.14	57	pass
2000.125	H	90.27	57	pass
2400.150	H	69.16	57	pass
2800.175	H	79.59	57	pass
3200.200	H	87.21	57	pass
3600.225	H	82	57	pass
4000.250	H	74.9	57	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
400.025	V	0		pass
800.050	V	82.29	57	pass
1200.075	V	72.63	57	pass
1600.100	V	84.12	57	pass
2000.125	V	85.13	57	pass
2400.150	V	74.22	57	pass
2800.175	V	75.42	57	pass
3200.200	V	86.32	57	pass
3600.225	V	84.07	57	pass
4000.250	V	79.03	57	pass

Measurement Result for 12.5 KHz Channel Separation @ 440.025MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
440.025	H	0		pass
880.050	H	79.93	57	pass
1320.075	H	71.76	57	pass
1760.100	H	94	57	pass
2200.125	H	80.53	57	pass
2640.150	H	63.04	57	pass
3080.175	H	79.59	57	pass
3520.200	H	70.51	57	pass
3960.225	H	87.2	57	pass
4400.250	H	74.9	57	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
440.025	V	0		pass
880.050	V	77.55	57	pass
1320.075	V	78.87	57	pass
1760.100	V	93.2	57	pass
2200.125	V	89.39	57	pass
2640.150	V	89.89	57	pass
3080.175	V	79.59	57	pass
3520.200	V	88.24	57	pass
3960.225	V	87.02	57	pass
4400.250	V	86.53	57	pass

Measurement Result for 12.5 KHz Channel Separation @ 479.975MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
479.975	H	0		pass
959.950	H	89.27	57	pass
1439.925	H	87.66	57	pass
1919.900	H	92.2	57	pass
2399.875	H	90.2	57	pass
2879.850	H	83.38	57	pass
3359.825	H	85.81	57	pass
3839.800	H	82.08	57	pass
4319.775	H	87.68	57	pass
4799.750	H	86.16	57	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
479.975	V	0		pass
959.950	V	62.51	57	pass
1439.925	V	69.27	57	pass
1919.900	V	92.2	57	pass
2399.875	V	88.7	57	pass
2879.850	V	82.14	57	pass
3359.825	V	83.91	57	pass
3839.800	V	79.77	57	pass
4319.775	V	83.2	57	pass
4799.750	V	84.39	57	pass

TEST RESULTS--1W

Measurement Result for 12.5 KHz Channel Separation @ 400.025MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
400.025	H	0		pass
800.050	H	83.31	50	pass
1200.075	H	75.26	50	pass
1600.100	H	91.24	50	pass
2000.125	H	89.61	50	pass
2400.150	H	72.54	50	pass
2800.175	H	77.69	50	pass
3200.200	H	87.59	50	pass
3600.225	H	81.53	50	pass
4000.250	H	78.53	50	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
400.025	V	0		pass
800.050	V	81.57	50	pass
1200.075	V	75.62	50	pass
1600.100	V	83.57	50	pass
2000.125	V	85.64	50	pass
2400.150	V	73.26	50	pass
2800.175	V	74.18	50	pass
3200.200	V	83.91	50	pass
3600.225	V	84.05	50	pass
4000.250	V	80.68	50	pass

Measurement Result for 12.5 KHz Channel Separation @ 440.025MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
440.025	H	0		pass
880.050	H	78.53	50	pass
1320.075	H	76.21	50	pass
1760.100	H	83.25	50	pass
2200.125	H	80.16	50	pass
2640.150	H	70.28	50	pass
3080.175	H	75.92	50	pass
3520.200	H	70.61	50	pass
3960.225	H	87.43	50	pass
4400.250	H	72.57	50	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
440.025	V	0		pass
880.050	V	78.63	50	pass
1320.075	V	79.57	50	pass
1760.100	V	85.24	50	pass
2200.125	V	84.61	50	pass
2640.150	V	88.52	50	pass
3080.175	V	79.61	50	pass
3520.200	V	85.18	50	pass
3960.225	V	87.24	50	pass
4400.250	V	86.15	50	pass

Measurement Result for 12.5 KHz Channel Separation @ 479.975MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
479.975	H	0		pass
959.950	H	86.59	50	pass
1439.925	H	87.37	50	pass
1919.900	H	88.62	50	pass
2399.875	H	88.15	50	pass
2879.850	H	83.27	50	pass
3359.825	H	84.68	50	pass
3839.800	H	83.53	50	pass
4319.775	H	84.26	50	pass
4799.750	H	85.42	50	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
479.975	V	0		pass
959.950	V	70.24	50	pass
1439.925	V	68.29	50	pass
1919.900	V	85.19	50	pass
2399.875	V	86.28	50	pass
2879.850	V	84.39	50	pass
3359.825	V	81.41	50	pass
3839.800	V	80.16	50	pass
4319.775	V	82.14	50	pass
4799.750	V	83.26	50	pass

Digital:

TEST RESULTS-5W

Measurement Result for 12.5 KHz Channel Separation @ 400.025MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
400.025	H	0		pass
800.050	H	86.23	57	pass
1200.075	H	72.13	57	pass
1600.100	H	94.17	57	pass
2000.125	H	89.16	57	pass
2400.150	H	69.32	57	pass
2800.175	H	79.47	57	pass
3200.200	H	87.47	57	pass
3600.225	H	81.53	57	pass
4000.250	H	75.31	57	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
400.025	V	0		pass
800.050	V	82.36	57	pass
1200.075	V	72.54	57	pass
1600.100	V	84.17	57	pass
2000.125	V	84.97	57	pass
2400.150	V	75.38	57	pass
2800.175	V	75.61	57	pass
3200.200	V	85.36	57	pass
3600.225	V	83.49	57	pass
4000.250	V	79.35	57	pass

Measurement Result for 12.5 KHz Channel Separation @ 440.025MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
440.025	H	0		pass
880.050	H	78.52	57	pass
1320.075	H	73.28	57	pass
1760.100	H	93.41	57	pass
2200.125	H	81.34	57	pass
2640.150	H	65.47	57	pass
3080.175	H	78.15	57	pass
3520.200	H	72.62	57	pass
3960.225	H	85.37	57	pass
4400.250	H	73.95	57	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
440.025	V	0		pass
880.050	V	75.29	57	pass
1320.075	V	78.25	57	pass
1760.100	V	94.15	57	pass
2200.125	V	88.36	57	pass
2640.150	V	88.75	57	pass
3080.175	V	79.49	57	pass
3520.200	V	88.25	57	pass
3960.225	V	86.92	57	pass
4400.250	V	85.68	57	pass

Measurement Result for 12.5 KHz Channel Separation @ 479.975MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
479.975	H	0		pass
959.950	H	88.38	57	pass
1439.925	H	86.97	57	pass
1919.900	H	93.14	57	pass
2399.875	H	92.1	57	pass
2879.850	H	83.96	57	pass
3359.825	H	85.47	57	pass
3839.800	H	82.46	57	pass
4319.775	H	86.57	57	pass
4799.750	H	86.44	57	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
479.975	V	0		pass
959.950	V	83.29	57	pass
1439.925	V	69.35	57	pass
1919.900	V	90.48	57	pass
2399.875	V	88.5	57	pass
2879.850	V	81.39	57	pass
3359.825	V	82.6	57	pass
3839.800	V	80.14	57	pass
4319.775	V	82.61	57	pass
4799.750	V	83.37	57	pass

TEST RESULTS-1W

Measurement Result for 12.5 KHz Channel Separation @ 400.025MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
400.025	H	0		pass
800.050	H	84.39	50	pass
1200.075	H	78.15	50	pass
1600.100	H	82.49	50	pass
2000.125	H	81.63	50	pass
2400.150	H	72.58	50	pass
2800.175	H	78.29	50	pass
3200.200	H	86.59	50	pass
3600.225	H	84.62	50	pass
4000.250	H	81.27	50	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
400.025	V	0		pass
800.050	V	82.26	50	pass
1200.075	V	78.52	50	pass
1600.100	V	81.68	50	pass
2000.125	V	82.81	50	pass
2400.150	V	76.31	50	pass
2800.175	V	78.43	50	pass
3200.200	V	81.62	50	pass
3600.225	V	82.69	50	pass
4000.250	V	80.62	50	pass

Measurement Result for 12.5 KHz Channel Separation @ 440.025MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
440.025	H	0		pass
880.050	H	74.86	50	pass
1320.075	H	74.25	50	pass
1760.100	H	79.52	50	pass
2200.125	H	80.04	50	pass
2640.150	H	82.13	50	pass
3080.175	H	81.64	50	pass
3520.200	H	80.33	50	pass
3960.225	H	82.48	50	pass
4400.250	H	83.37	50	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
440.025	V	0		pass
880.050	V	77.85	50	pass
1320.075	V	78.62	50	pass
1760.100	V	80.52	50	pass
2200.125	V	82.69	50	pass
2640.150	V	81.26	50	pass
3080.175	V	85.63	50	pass
3520.200	V	84.61	50	pass
3960.225	V	85.31	50	pass
4400.250	V	86.95	50	pass

Measurement Result for 12.5 KHz Channel Separation @ 479.975MHz

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
479.975	H	0		pass
959.950	H	77.52	50	pass
1439.925	H	75.63	50	pass
1919.900	H	78.16	50	pass
2399.875	H	77.59	50	pass
2879.850	H	80.52	50	pass
3359.825	H	81.59	50	pass
3839.800	H	82.61	50	pass
4319.775	H	84.69	50	pass
4799.750	H	85.48	50	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result Below carrier(dBc)	Limit below carrier(dBc)	Result(P/F)
479.975	V	0		pass
959.950	V	78.62	50	pass
1439.925	V	77.92	50	pass
1919.900	V	80.24	50	pass
2399.875	V	80.92	50	pass
2879.850	V	82.51	50	pass
3359.825	V	83.52	50	pass
3839.800	V	83.46	50	pass
4319.775	V	84.62	50	pass
4799.750	V	85.95	50	pass

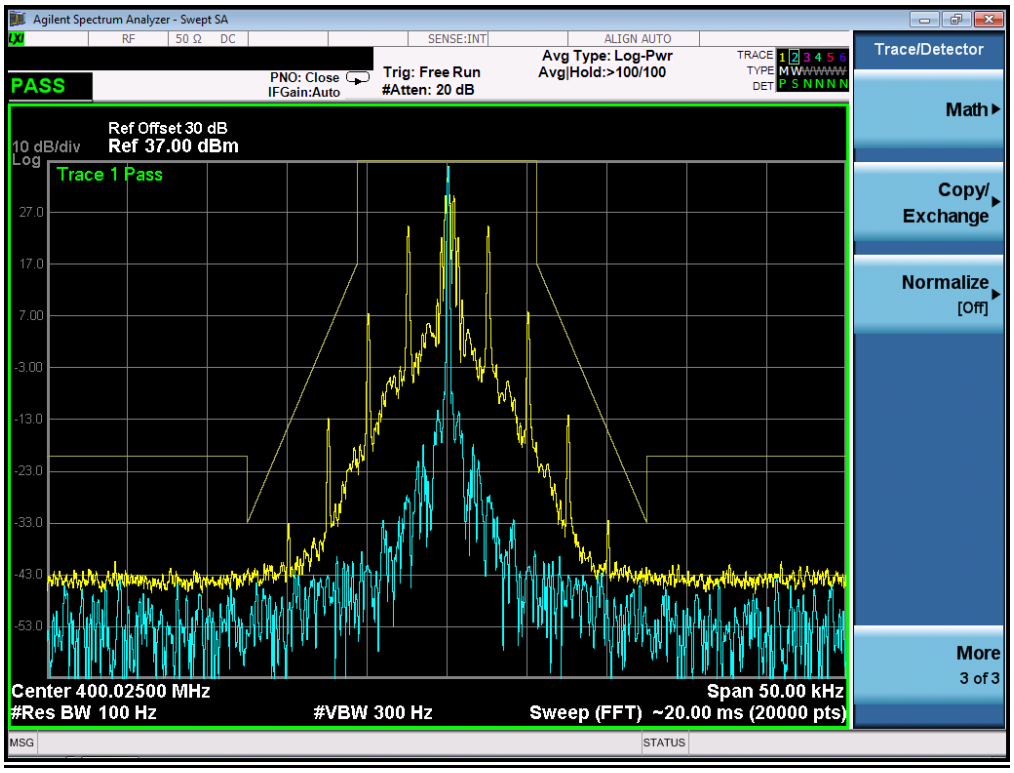
7.5 EMISSION MASK PLOT

The detailed procedure employed for Emission Mask measurements are specified as following:

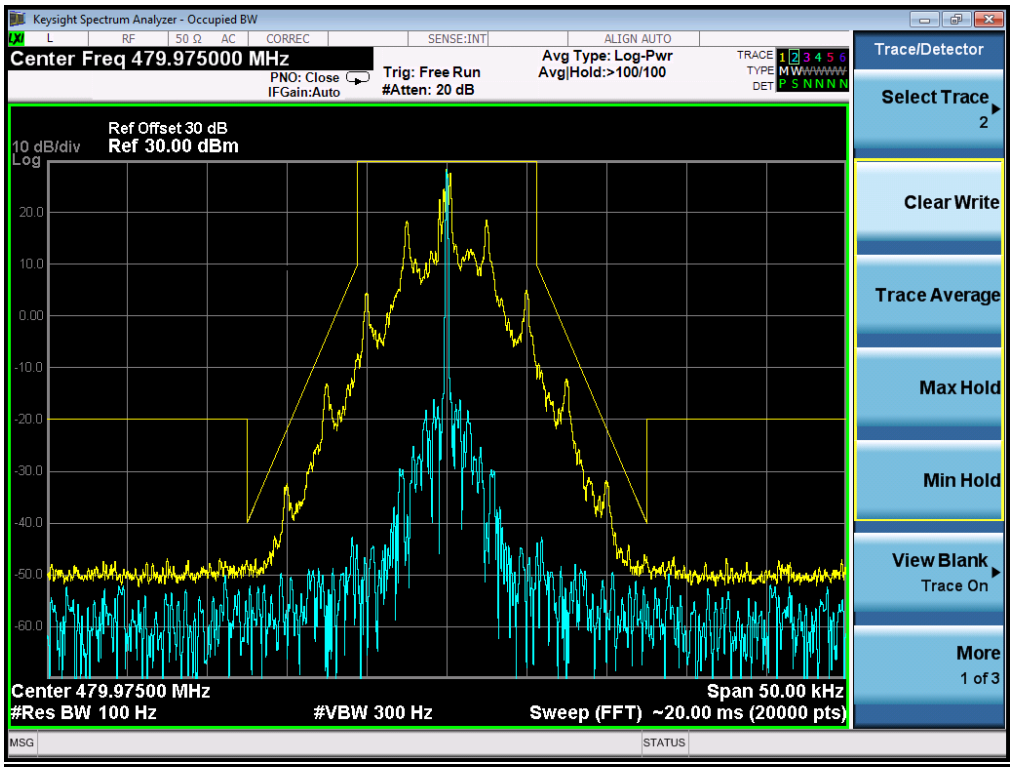
- The transmitter shall be modulated by a 2.5 kHz audio signal,
- The level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz.

Analog:

The Worst Emission Mask D for 12.5 KHz channel Separation (5W)

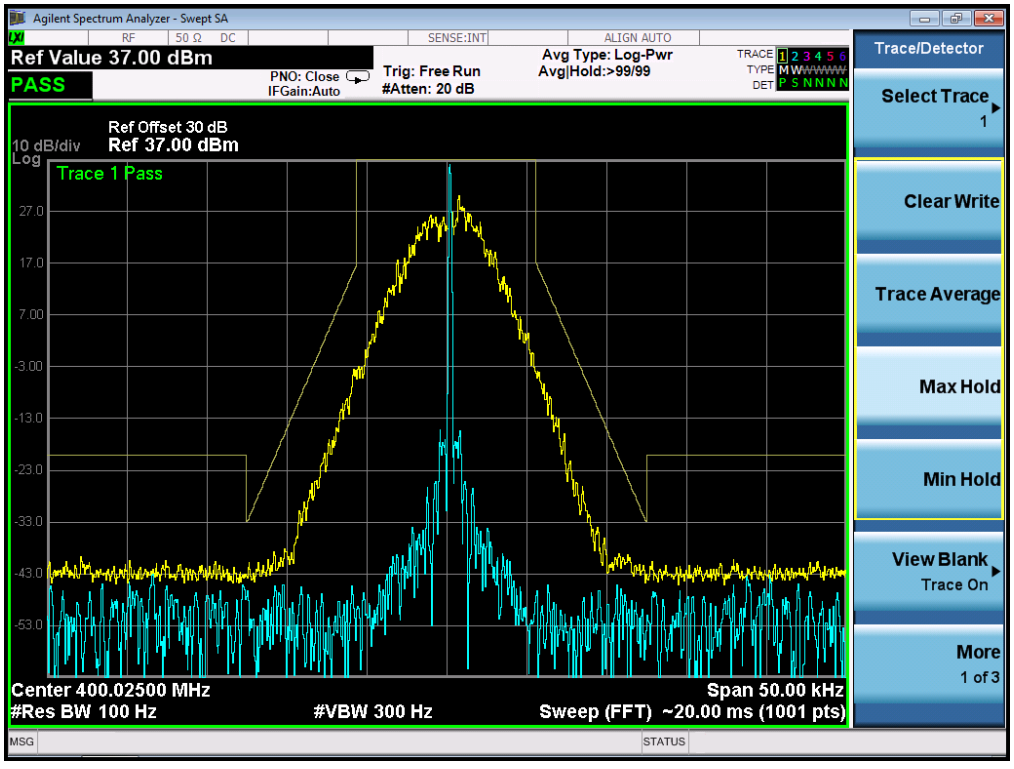


The Worst Emission Mask D for 12.5 KHz channel Separation (1W)

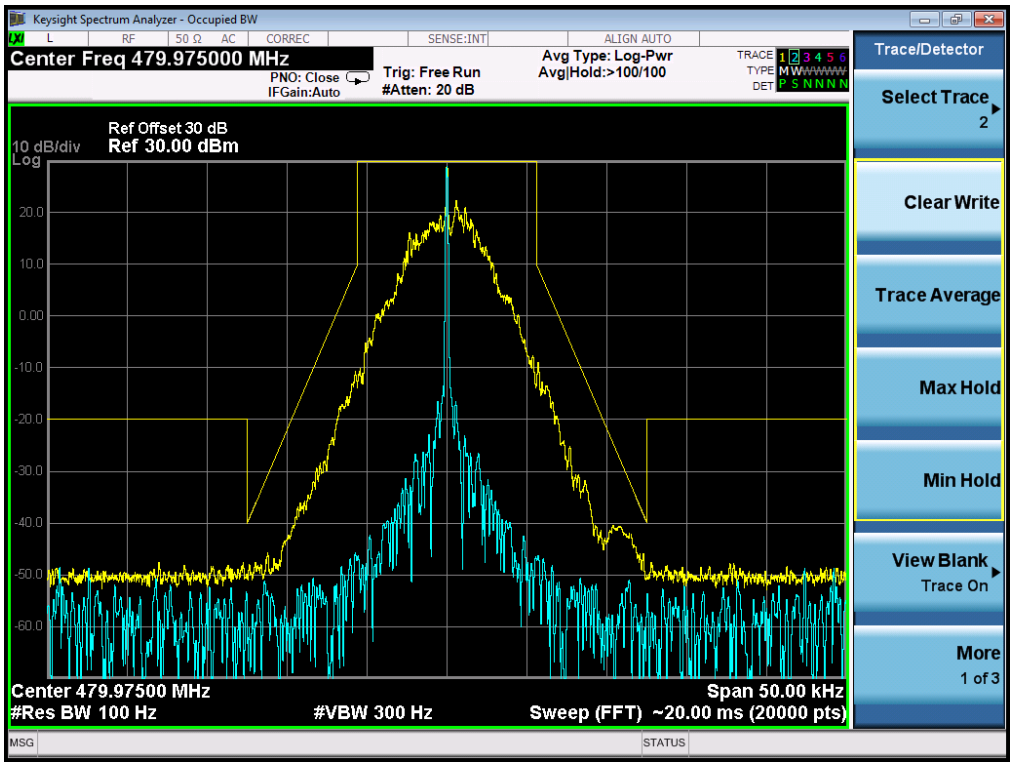


Digital：

The Worst Emission Mask D for 12.5 KHz channel Separation (5W)



The Worst Emission Mask D for 12.5 KHz channel Separation (5W)



8. MODULATION CHARACTERISTICS

8.1 PROVISIONS APPLICABLE

According to CFR 47 section 2.1047(a), for Voice Modulation Communication Equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000Hz shall be measured.

8.2 MEASUREMENT METHOD

8.2.1 Modulation Limit

(1). Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1KHz using this level as a reference (0dB) and vary the input level from –20 to +20dB. Record the frequency deviation obtained as a function of the input level.

(2). Repeat step 1 with input frequency changing to 300, 1000, 1500 and 3000Hz in sequence.

8.2.2 Audio Frequency Response

(1). Configure the EUT as shown in figure 1.

(2). Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0 dB).

(3). Vary the Audio frequency from 100 Hz to 10 KHz and record the frequency deviation.

(4). Audio Frequency Response = 20log10 (Deviation of test frequency/Deviation of 1 KHz reference).

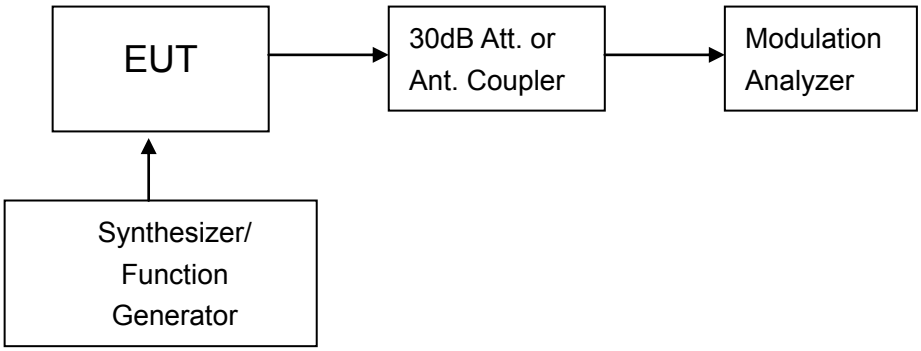


Figure 1: Modulation characteristic measurement configuration

8.3 MEASUREMENT RESULT

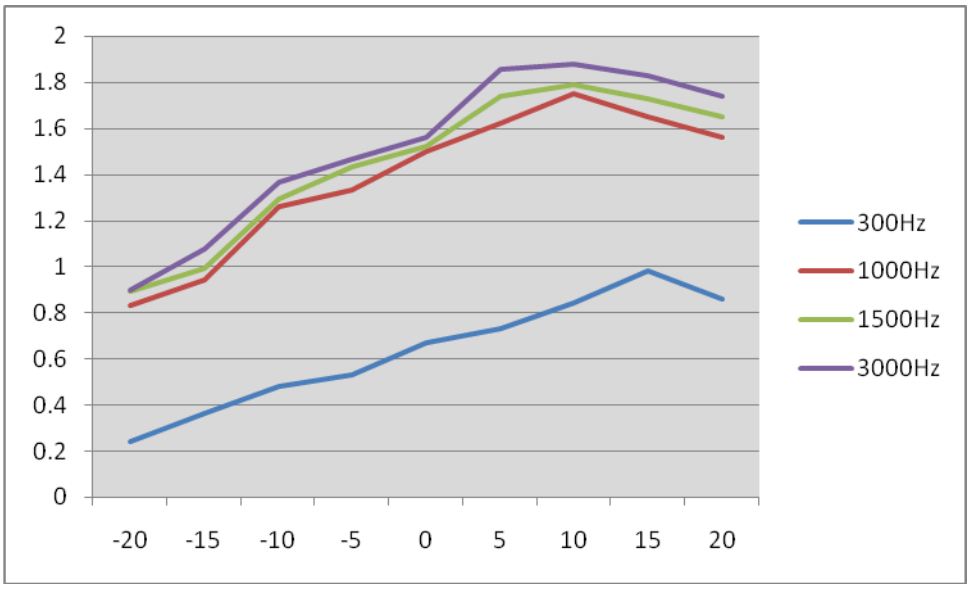
Analog:

TEST RESULTS FOR H POWER

(A). MODULATION LIMIT:

Middle Channel @ 12.5 KHz Channel Separations

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz	Peak Freq. Deviation At 1000 Hz	Peak Freq. Deviation At 1500 Hz	Peak Freq. Deviation At 3000 Hz
-20	0.12	0.22	0.82	0.88
-15	0.16	0.37	0.94	0.97
-10	0.22	0.41	1.27	1.27
-5	0.31	0.52	1.34	1.43
0	0.55	0.64	1.53	1.52
+5	0.62	0.72	1.63	1.74
+10	0.75	0.87	1.75	1.78
+15	0.84	0.96	1.65	1.77
+20	0.91	0.82	1.58	1.67



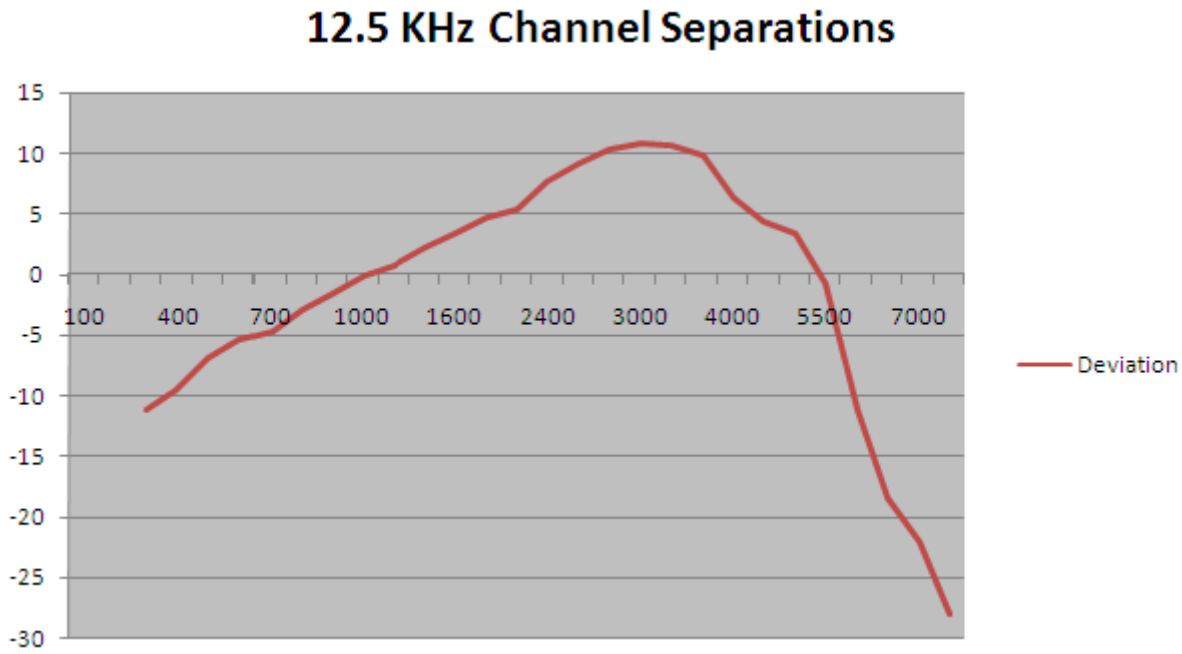
Note: All the modes had been tested, but only the worst data recorded in the report.

(B). AUDIO FREQUENCY RESPONSE:

Middle Channel @ 12.5 KHz Channel Separations

Frequency (Hz)	Deviation (KHz)	Audio Frequency Response(dB)
100	--	--
200	--	--
300	0.14	-11.06
400	0.17	-9.37
500	0.23	-6.74
600	0.27	-5.35
700	0.29	-4.73
800	0.36	-2.85
900	0.42	-1.51
1000	0.50	0.00
1200	0.55	0.83
1400	0.65	2.28
1600	0.75	3.52
1800	0.86	4.71
2000	0.94	5.48
2400	1.22	7.75
2500	1.44	9.19
2800	1.66	10.42
3000	1.75	10.88
3200	1.71	10.68
3600	1.56	9.88
4000	1.05	6.44
4500	0.84	4.51
5000	0.75	3.52
5500	0.46	-0.72
6000	0.14	-11.06
6500	0.06	-18.42
7000	0.04	-21.94
7500	0.02	-27.96
9000	--	--
10000	--	--
14000	--	--
18000	--	--
20000	--	--
30000	--	--

Frequency Response of Middle Channel



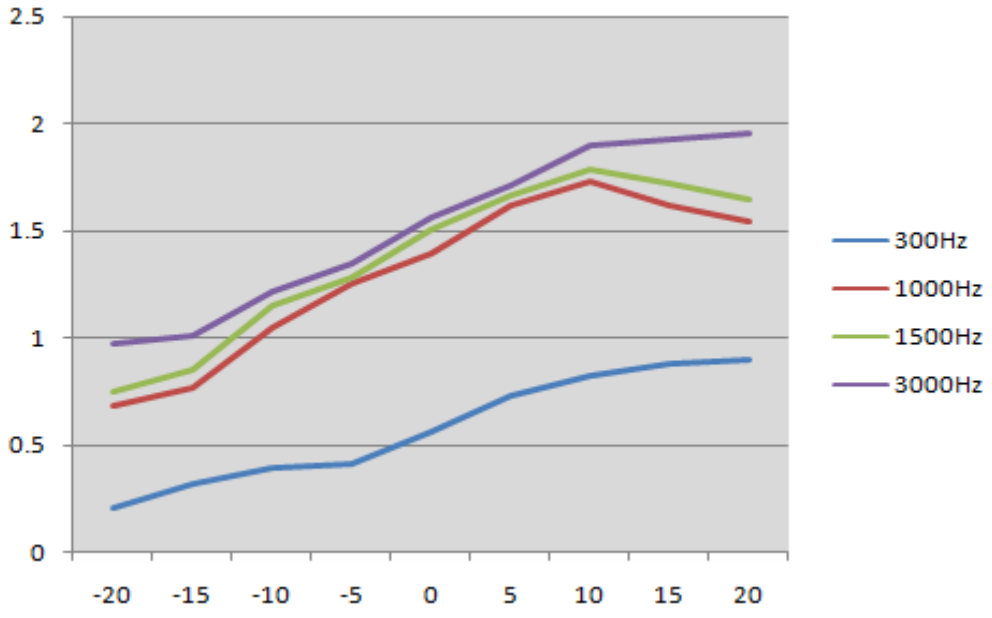
Note: All the modes had been tested, but only the worst data recorded in the report.

TEST RESULTS FOR L POWER

(A). MODULATION LIMIT:

Bottom Channel @ 12.5 KHz Channel Separations

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz	Peak Freq. Deviation At 1000 Hz	Peak Freq. Deviation At 1500 Hz	Peak Freq. Deviation At 3000 Hz
-20	0.2	0.68	0.75	0.97
-15	0.31	0.76	0.85	1.01
-10	0.39	1.05	1.15	1.21
-5	0.41	1.25	1.28	1.34
0	0.56	1.39	1.51	1.56
+5	0.73	1.62	1.67	1.71
+10	0.82	1.73	1.79	1.89
+15	0.88	1.62	1.72	1.92
+20	0.9	1.54	1.65	1.95



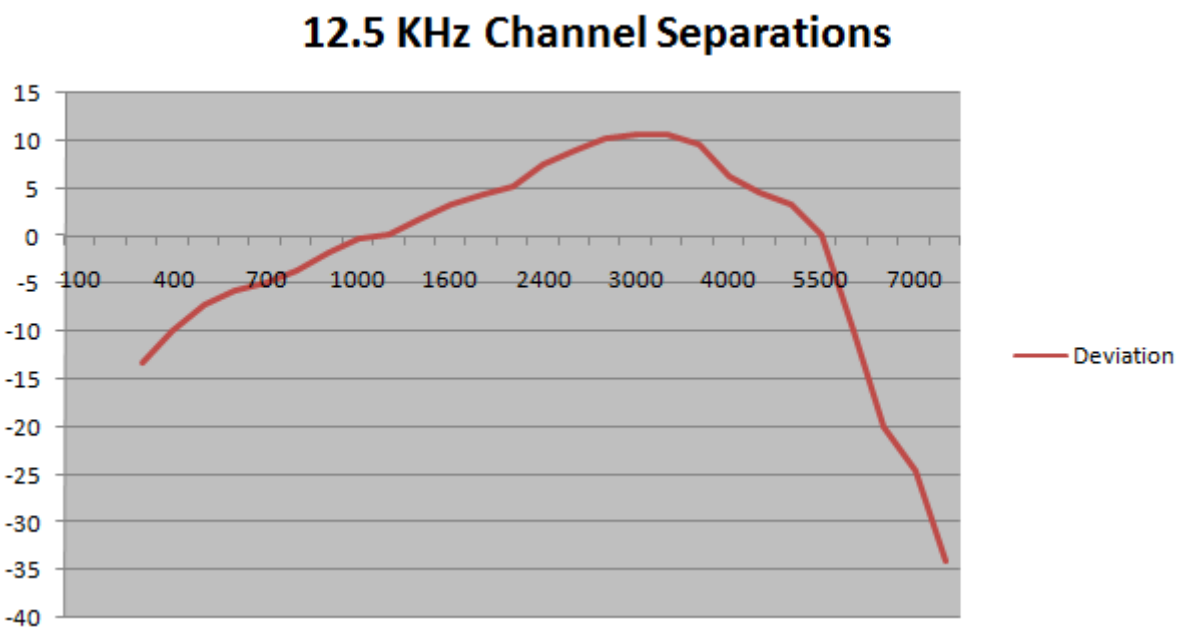
Note: All the modes had been tested, but only the worst data recorded in the report.

(B). AUDIO FREQUENCY RESPONSE:

Bottom Channel @ 12.5 KHz Channel Separations

Frequency (Hz)	Deviation (KHz)	Audio Frequency Response(dB)
100	--	--
200	--	--
300	0.11	-13.15
400	0.16	-9.90
500	0.22	-7.13
600	0.26	-5.68
700	0.29	-4.73
800	0.33	-3.61
900	0.41	-1.72
1000	0.49	-0.18
1200	0.52	0.34
1400	0.62	1.87
1600	0.74	3.41
1800	0.83	4.40
2000	0.92	5.30
2400	1.2	7.60
2500	1.41	9.00
2800	1.64	10.32
3000	1.72	10.73
3200	1.7	10.63
3600	1.52	9.66
4000	1.03	6.28
4500	0.85	4.61
5000	0.74	3.41
5500	0.52	0.34
6000	0.16	-9.90
6500	0.05	-20.00
7000	0.03	-24.44
7500	0.01	-33.98
9000	--	--
10000	--	--
14000	--	--
18000	--	--
20000	--	--
30000	--	--

Frequency Response of Bottom Channel



Note: All the modes had been tested, but only the worst data recorded in the report.

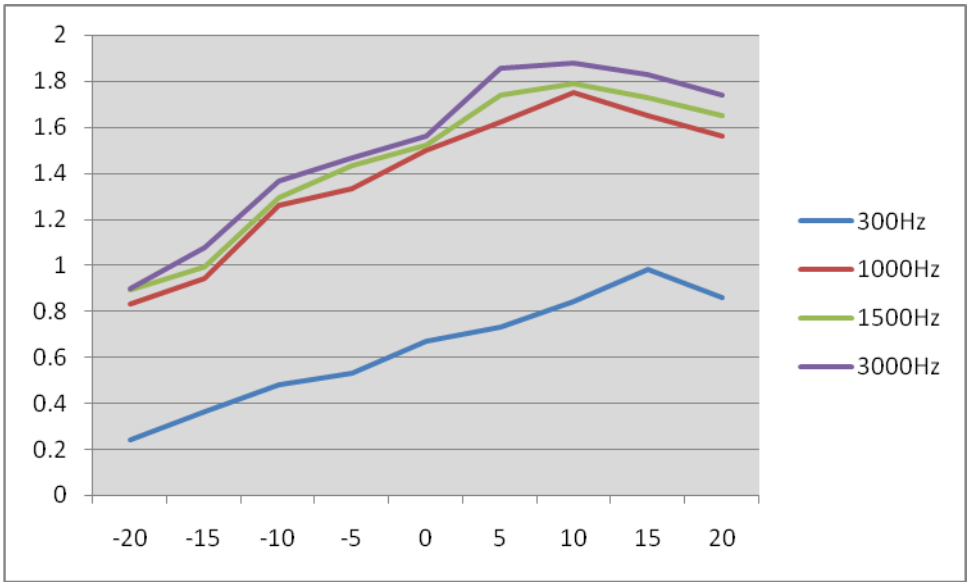
Digital:

TEST RESULT TS FOR H POWER LEVEL

(A). MODULATION LIMIT:

High Channel @ 12.5 KHz Channel Separations

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz	Peak Freq. Deviation At 1000 Hz	Peak Freq. Deviation At 1500 Hz	Peak Freq. Deviation At 3000 Hz
-20	0.11	0.23	0.82	0.88
-15	0.15	0.35	0.91	0.94
-10	0.25	0.44	1.23	1.26
-5	0.36	0.51	1.35	1.42
0	0.57	0.67	1.51	1.51
+5	0.60	0.72	1.64	1.75
+10	0.74	0.83	1.75	1.72
+15	0.87	0.94	1.62	1.76
+20	0.94	0.81	1.58	1.68



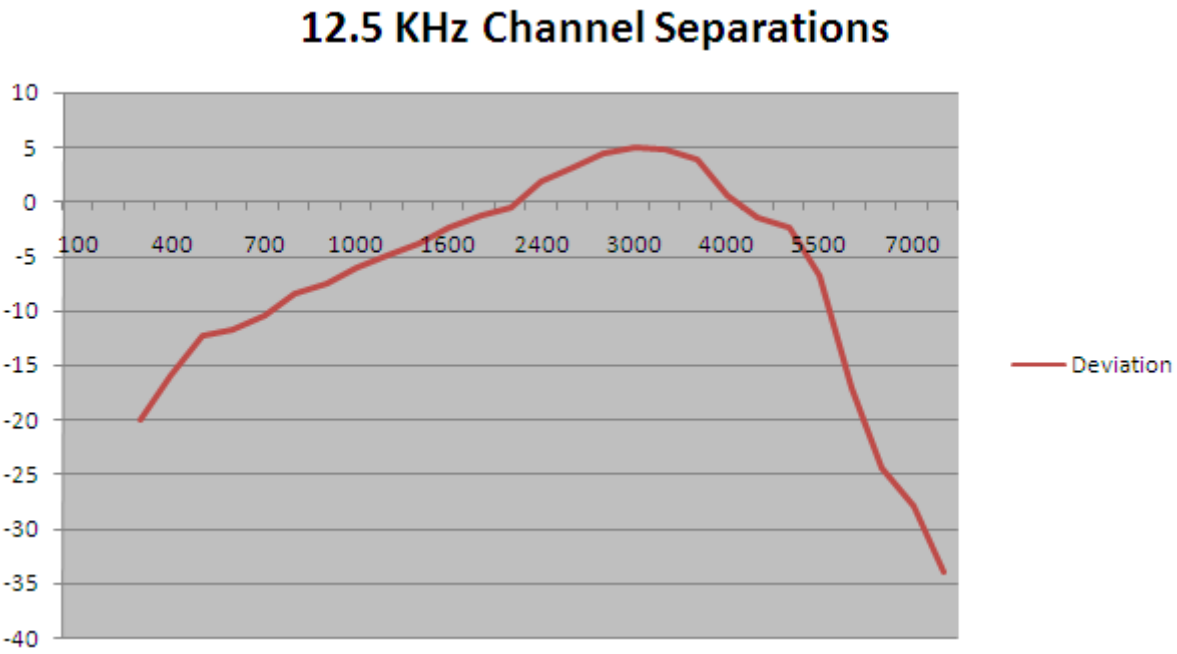
Note: All the modes had been tested, but only the worst data recorded in the report.

(B). AUDIO FREQUENCY RESPONSE:

High Channel @ 12.5 KHz Channel Separations

Frequency (Hz)	Deviation (KHz)	Audio Frequency Response(dB)
100	--	--
200	--	--
300	0.05	-20.00
400	0.08	-15.92
500	0.12	-12.40
600	0.13	-11.70
700	0.15	-10.46
800	0.19	-8.40
900	0.21	-7.54
1000	0.25	-6.02
1200	0.28	-5.04
1400	0.32	-3.88
1600	0.38	-2.38
1800	0.43	-1.31
2000	0.47	-0.54
2400	0.61	1.73
2500	0.72	3.17
2800	0.83	4.40
3000	0.88	4.91
3200	0.86	4.71
3600	0.78	3.86
4000	0.53	0.51
4500	0.42	-1.51
5000	0.38	-2.38
5500	0.23	-6.74
6000	0.07	-17.08
6500	0.03	-24.44
7000	0.02	-27.96
7500	0.01	-33.98
9000	--	--
10000	--	--
14000	--	--
18000	--	--
20000	--	--
30000	--	--

Frequency Response of High Channel

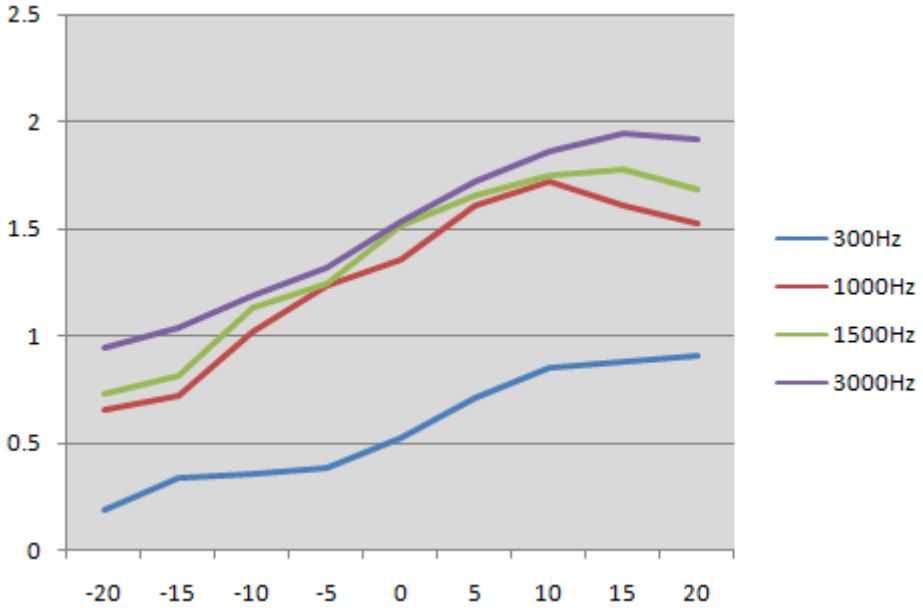


Note: All the modes had been tested, but only the worst data recorded in the report.

(A). MODULATION LIMIT:

Bottom Channel @ 12.5 KHz Channel Separations---L Power

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz	Peak Freq. Deviation At 1000 Hz	Peak Freq. Deviation At 1500 Hz	Peak Freq. Deviation At 3000 Hz
-20	0.19	0.65	0.73	0.94
-15	0.34	0.72	0.81	1.03
-10	0.36	1.02	1.13	1.18
-5	0.39	1.23	1.25	1.31
0	0.53	1.35	1.52	1.53
+5	0.71	1.61	1.66	1.72
+10	0.85	1.72	1.75	1.86
+15	0.88	1.61	1.78	1.94
+20	0.91	1.52	1.69	1.91



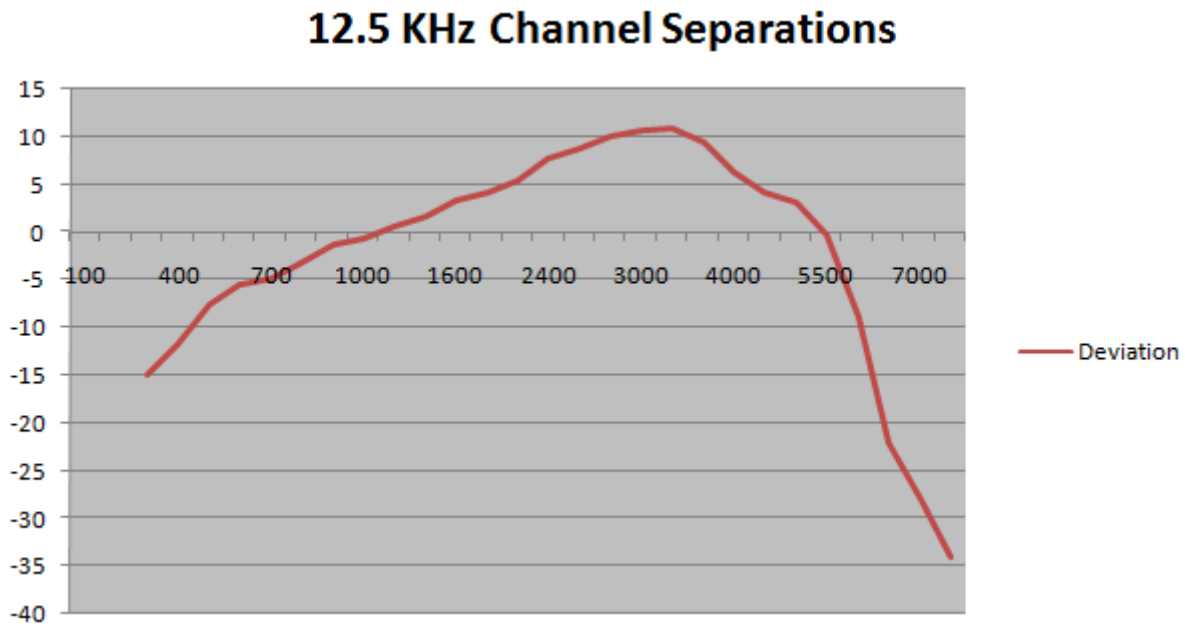
Note: All the modes had been tested, but only the worst data recorded in the report.

(B). AUDIO FREQUENCY RESPONSE:

Bottom Channel @ 12.5 KHz Channel Separations---L Power

Frequency (Hz)	Deviation (KHz)	Audio Frequency Response(dB)
100	--	--
200	--	--
300	0.09	-14.89
400	0.13	-11.70
500	0.21	-7.54
600	0.27	-5.35
700	0.29	-4.73
800	0.35	-3.10
900	0.43	-1.31
1000	0.47	-0.54
1200	0.54	0.67
1400	0.61	1.73
1600	0.73	3.29
1800	0.82	4.30
2000	0.94	5.48
2400	1.23	7.82
2500	1.39	8.88
2800	1.61	10.16
3000	1.7	10.63
3200	1.76	10.93
3600	1.49	9.48
4000	1.03	6.28
4500	0.81	4.19
5000	0.72	3.17
5500	0.49	-0.18
6000	0.18	-8.87
6500	0.04	-21.94
7000	0.02	-27.96
7500	0.01	-33.98
9000	--	--
10000	--	--
14000	--	--
18000	--	--
20000	--	--
30000	--	--

Frequency Response of Bottom Channel---L Power



Note: All the modes had been tested, but only the worst data recorded in the report.

9. MAXIMUMN TRANSMITTER POWER (CONDUCTED OUTPUT POWER)

9.1 PROVISIONS APPLICABLE

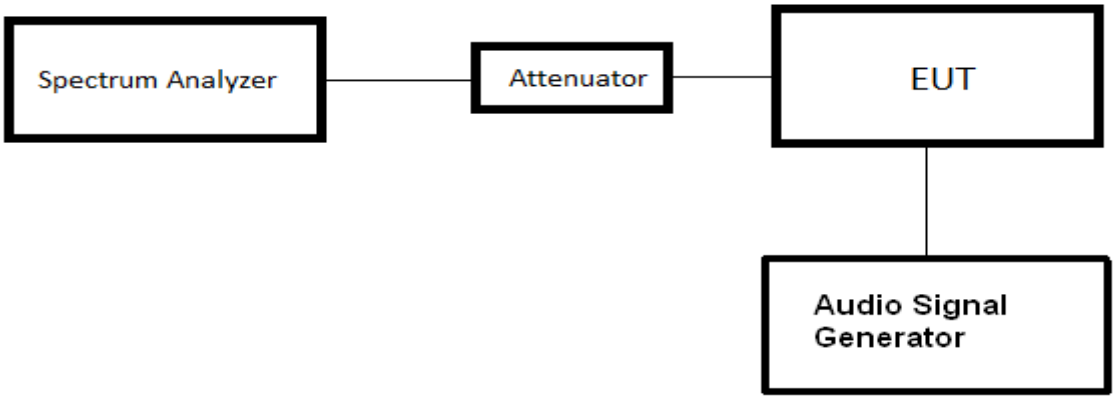
Per FCC §2.1046 and §90.205: Maximum ERP is dependent upon the station's antenna HAAT and required service area.

9.2 TEST PROCEDURE

The RF output of Two-way Radio was conducted to a spectrum analyzer through an appropriate attenuator.

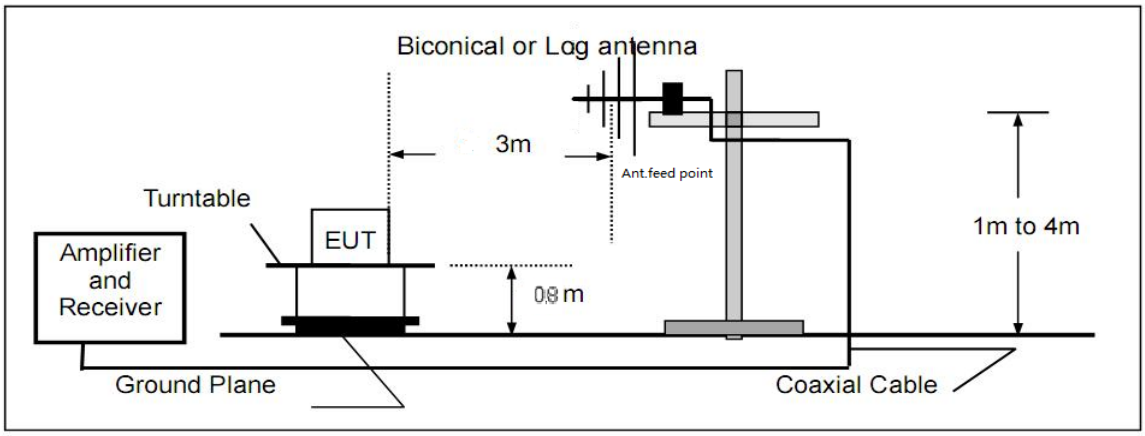
9.3 TEST CONFIGURATION

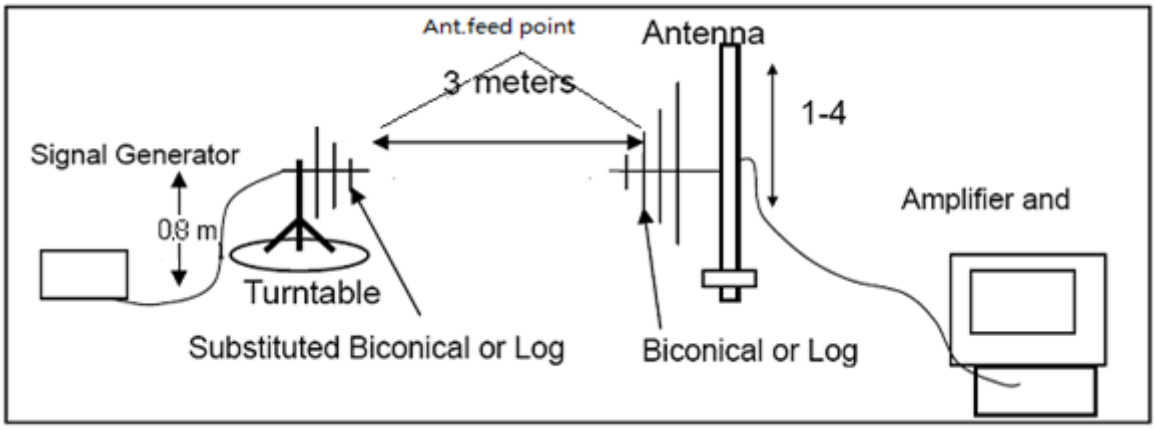
Conducted Output Power:



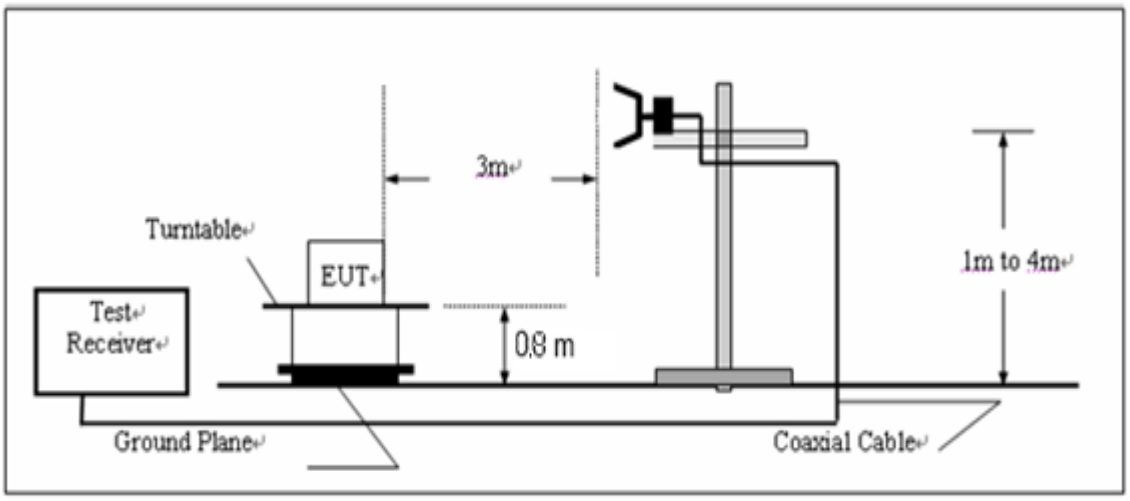
Effective Radiated Power

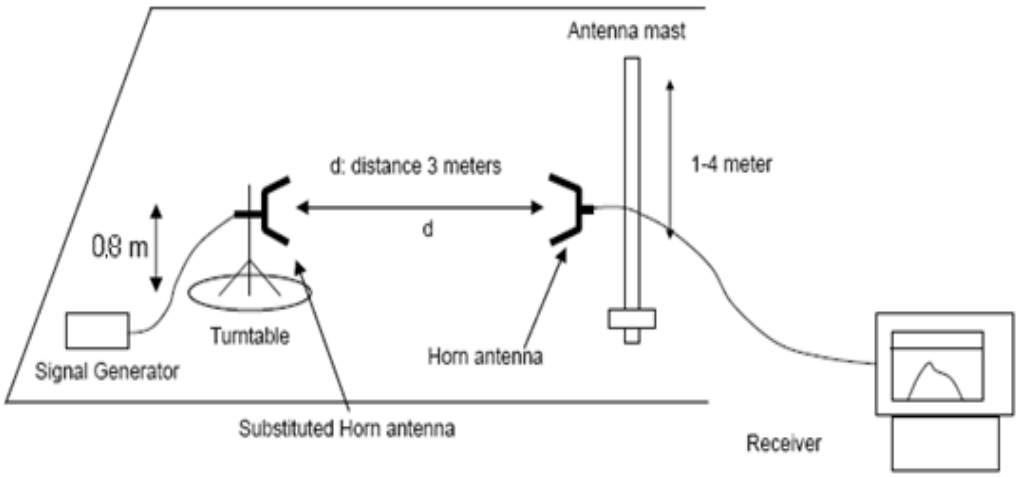
Radiated Below1GHz





Radiated Above 1 GHz





9.4 TEST RESULT

The maximum Conducted Power (CP) is

Analog: 5W/1 W for 12.5 KHz Channel Separation

Digital: 5W/1 W for 12.5 KHz Channel Separation

Calculation Formula: CP = R + A + L

***** Note:

CP: The final Conducted Power

R : The reading value from spectrum analyzer

A : The attenuation value of the used attenuator

L : The loss of all connection cables

Analog:

Conducted Power Measurement Results-5W		
Channel Separation	**Channel**	**Measurement Result (dBm)**
		For 36.99dBm(5W)
12.5 KHz	Bottom(400.025MHz)	36.87
	Middle(440.025MHz)	36.71
	Top (479.975MHz)	36.65

Radiated Power Measurement Results-5W		
Channel Separation	**Channel**	**Measurement Result (dBm)**
		For 36.99dBm(5W)
12.5 KHz	Bottom(400.025MHz)	36.85
	Middle(440.025MHz)	36.76
	Top (479.975MHz)	36.68

Conducted Power Measurement Results-1W		
Channel Separation	Channel	Measurement Result (dBm)
		For 30dBm(1W)
12.5 KHz	Bottom(400.025MHz)	29.94
	Middle(440.025MHz)	29.75
	Top (479.975MHz)	29.91

Radiated Power Measurement Results-1W		
Channel Separation	Channel	Measurement Result (dBm)
		For 30dBm(1W)
12.5 KHz	Bottom(400.025MHz)	29.89
	Middle(440.025MHz)	29.81
	Top (479.975MHz)	29.93

Digital:

Date + voice:

Conducted Power Measurement Results		
Channel Separation	**Channel**	**Measurement Result (dBm)**
		For 36.99dBm(5W)
12.5 KHz	Bottom(400.025MHz)	36.81
	Middle(440.025MHz)	36.70
	Top (479.975MHz)	36.75

Radiated Power Measurement Results		
Channel Separation	**Channel**	**Measurement Result (dBm)**
		For 36.99dBm(5W)
12.5 KHz	Bottom(400.025MHz)	36.91
	Middle(440.025MHz)	36.65
	Top (479.975MHz)	36.70

Date transmission mode:

Conducted Power Measurement Results		
Channel Separation	**Channel**	**Measurement Result (dBm)**
		For 36.99dBm(5W)
12.5 KHz	Bottom(400.025MHz)	36.70
	Middle(440.025MHz)	36.69
	Top (479.975MHz)	36.63

Radiated Power Measurement Results		
Channel Separation	**Channel**	**Measurement Result (dBm)**
		For 36.99dBm(5W)
12.5 KHz	Bottom(400.025MHz)	36.81
	Middle(440.025MHz)	36.72
	Top (479.975MHz)	36.85

Date + voice:

Conducted Power Measurement Results		
Channel Separation	Channel	Measurement Result (dBm)
		For 30dBm(1W)
12.5 KHz	Bottom(400.025MHz)	29.88
	Middle(440.025MHz)	29.83
	Top (479.975MHz)	29.93

Radiated Power Measurement Results		
Channel Separation	Channel	Measurement Result (dBm)
		For 30dBm(1W)
12.5 KHz	Bottom(400.025MHz)	29.80
	Middle(440.025MHz)	29.58
	Top (479.975MHz)	29.61

Date transmission mode:

Conducted Power Measurement Results		
Channel Separation	Channel	Measurement Result (dBm)
		For 30dBm(1W)
12.5 KHz	Bottom(400.025MHz)	29.85
	Middle(440.025MHz)	29.81
	Top (479.975MHz)	29.79

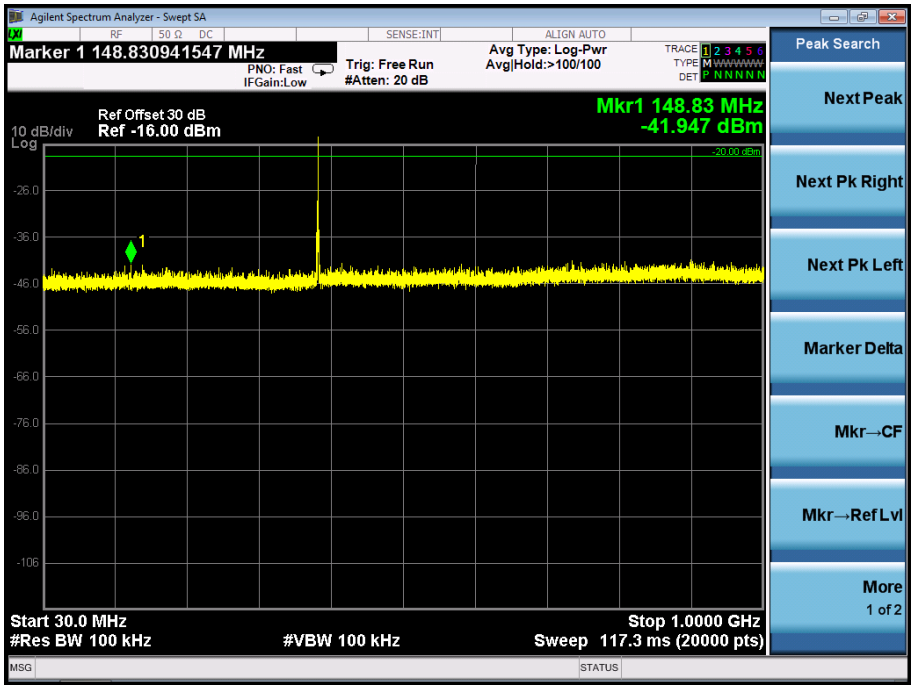
Radiated Power Measurement Results		
Channel Separation	Channel	Measurement Result (dBm)
		For 30dBm(1W)
12.5 KHz	Bottom(400.025MHz)	29.82
	Middle(440.025MHz)	29.87
	Top (479.975MHz)	29.62

9.5 CONDUCT SPURIOUS PLOT

Analog:

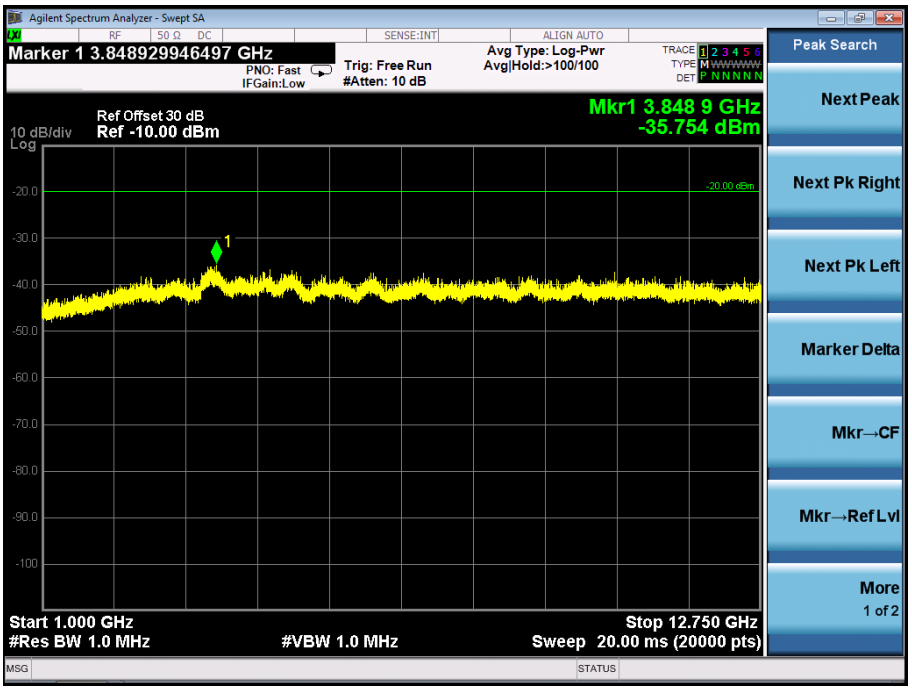
Conducted Spurious Emission (worst) @ 400.025MHz With 12.5 KHz Channel Separation-5W

30MHz-1GHz



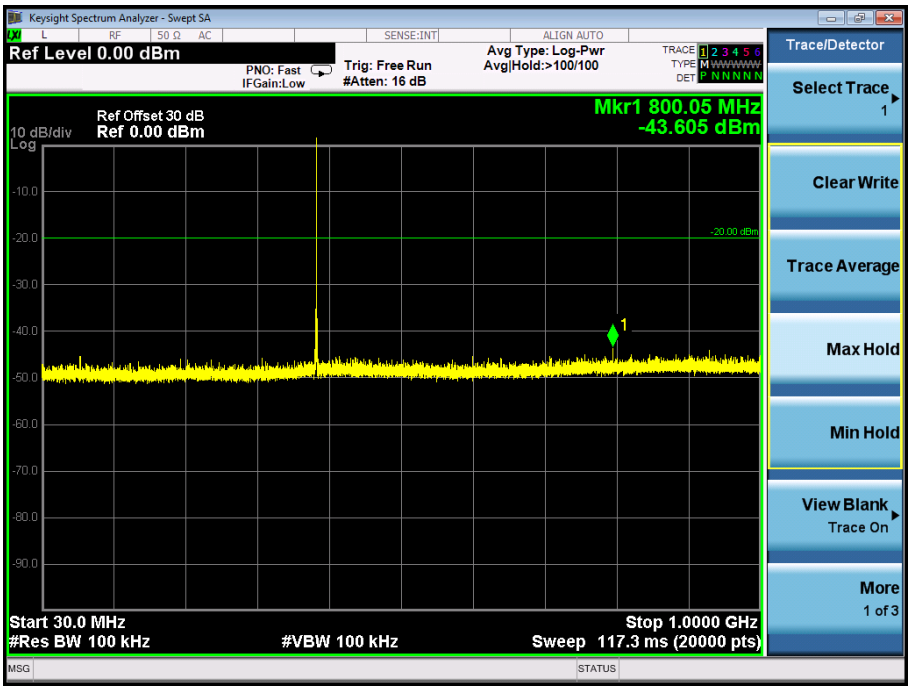
Conduct Spurious Emission (worst) @ 400.025MHz With 12.5 KHz Channel Separation-5W

1GHz-12.75GHz



Conducted Spurious Emission (worst) @ 400.025MHz With 12.5 KHz Channel Separation-5W

30MHz-1GHz



Conduct Spurious Emission (worst) @ 400.025MHz With 12.5 KHz Channel Separation-5W

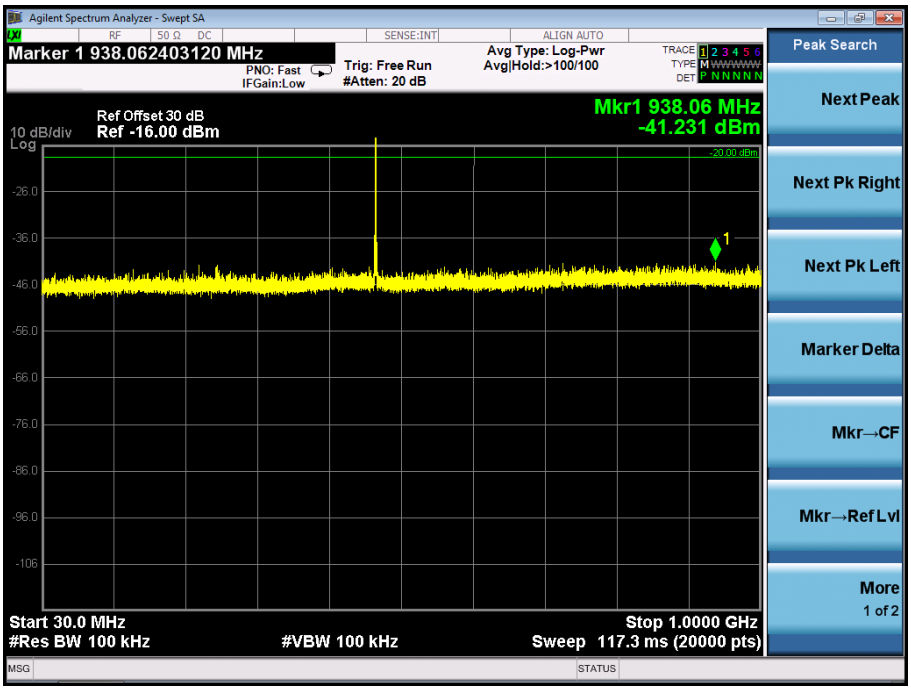
1GHz-12.75GHz

Note: All the test frequencies was tested, but only the worst data be recorded in this part.

Digital:

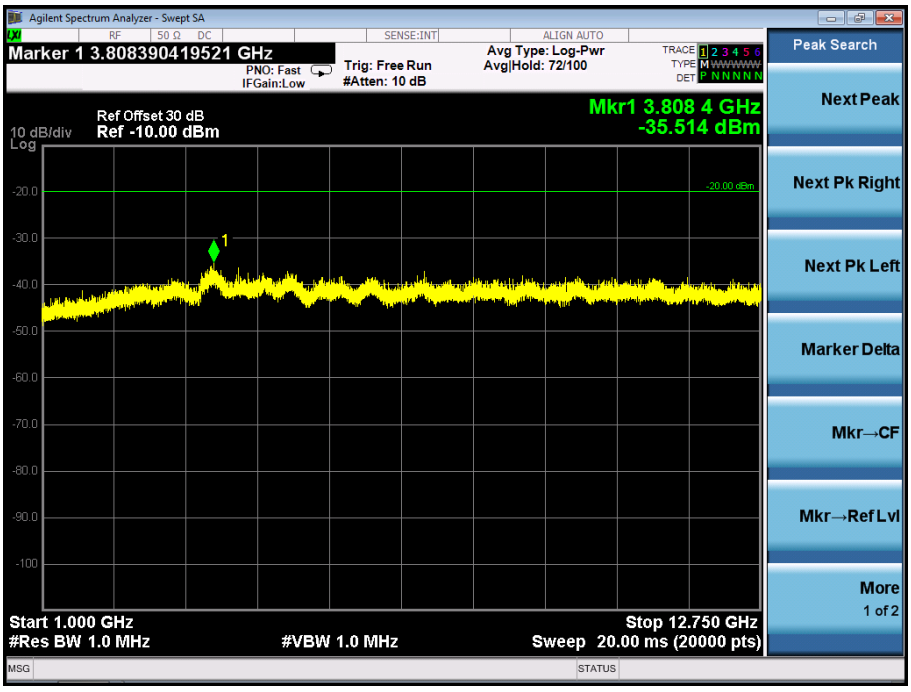
Conducted Spurious Emission (worst) @479.975MHz With 12.5 KHz Channel Separation-5W

30MHz-1GHz



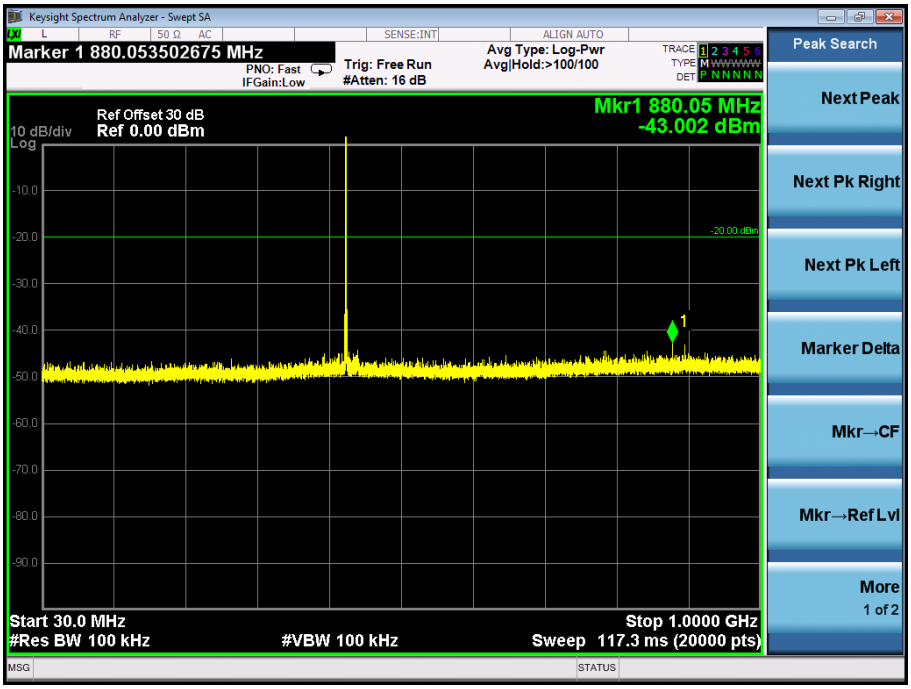
Conduct Spurious Emission (worst) @ 479.975MHz With 12.5 KHz Channel Separation-5W

1GHz-12.75GHz



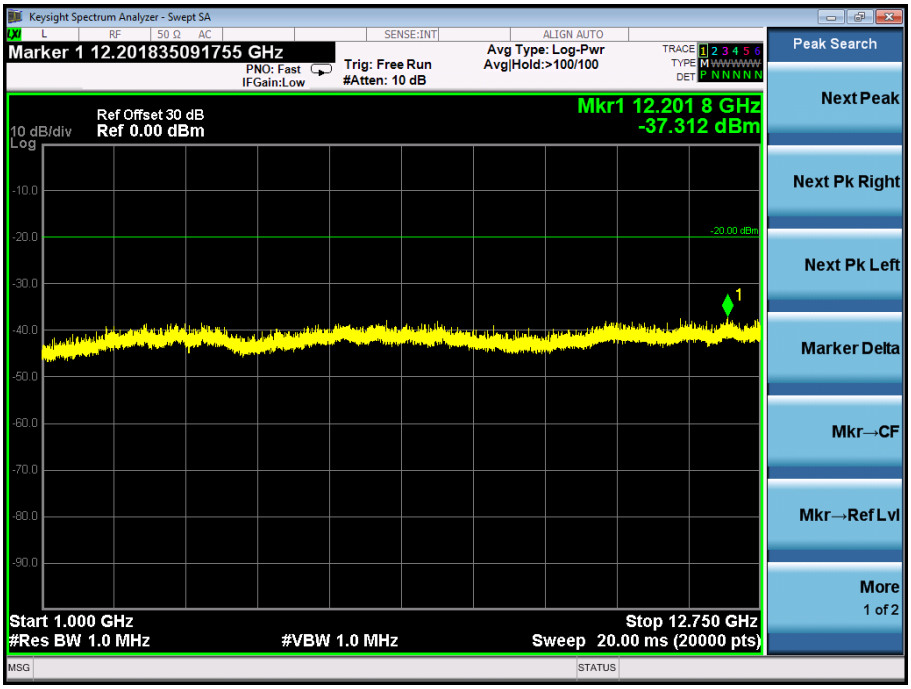
Conducted Spurious Emission (worst) @ 440.025MHz With 12.5 KHz Channel Separation-1W

30MHz-1GHz



Conduct Spurious Emission (worst) @ 440.025MHz With 12.5 KHz Channel Separation-1W

1GHz-12.75GHz



Note: All the test frequencies was tested, but only the worst data be recorded in this part.

10. RANSMITTER FREQUENCY BEHAVIOR

10.1PROVISIONS APPLICABLE

Section 90.214

Time intervals [1, 2]	Maximum frequency difference [3]	All equipment	
		150 to 174 MHz	421 to 512 MHz
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.

10.2 TEST METHOD

TIA/EIA-603 2.2.19

10.3 DESCRIBE LIMIT LINE OF RANSMITTER FREQUENCY BEHAVIOR

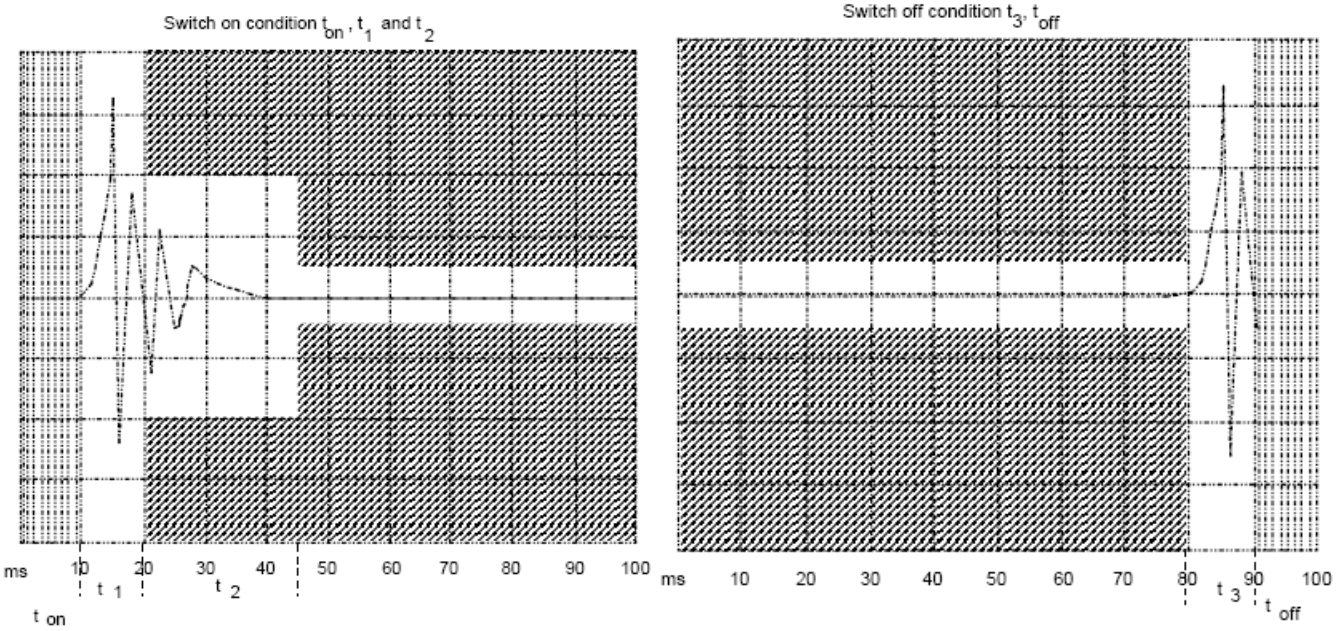
ton: The switch-on instant ton of a transmitter is defined by the condition when the output power, measured at the antenna terminal, exceeds 0,1 % of the full output power (-30 dBc).

t1: period of time starting at ton and finishing according to above 11.1

t2: period of time starting at the end of t1 and finishing according to above 11.1

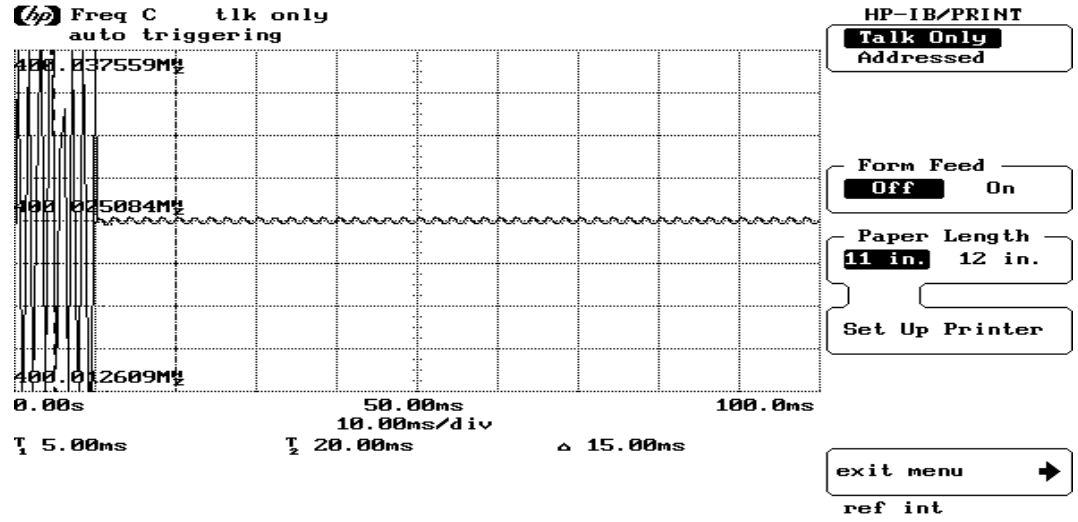
toff: switch-off instant defined by the condition when the output power falls below 0,1 % of the full output power (-30 dBc).

t3: period of time that finishing at toff and starting according to above 11.1

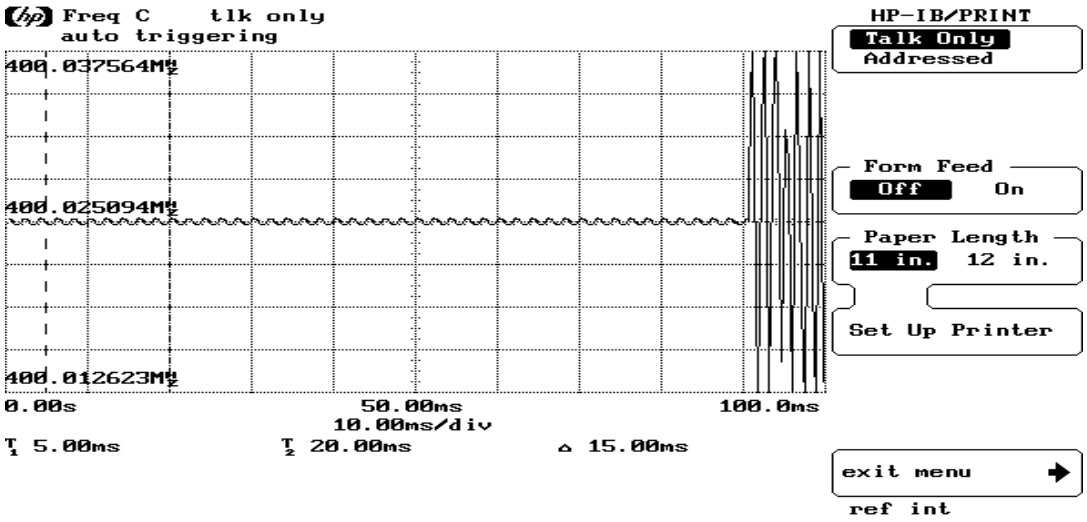


10.4 MEASURE RESULT

Transmitter Frequency Behavior @ 12.5 KHz Channel Separation--Off to On



Transmitter Frequency Behavior @ 12.5 KHz Channel Separation--On to Off



11. AUDIO LOW PASS FILTER RESPONSE

11.1 LIMITS

2.1047(a): Voice modulated communication equipment. A curve or equivalent data showing 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.
90.242(b)(8): Recommended audio filter attenuation characteristics are given below:

Audio band	Minimum Attenuation Rel. to 1 KHz Attenuation
3 –20 KHz 20 – 30 KHz	60 $\log_{10}$(f/3) dB where f is in KHz 50dB

11.2. METHOD OF MEASUREMENTS

The rated audio input signal was applied to the input of the audio low-pass filter (or of all modulation stages) using an audio oscillator, this input signal level and its corresponding output signal were then measured and recorded using the FFT Digital Spectrum Analyzer. Tests were repeated at different audio signal frequencies from 0 to 50 KHz.

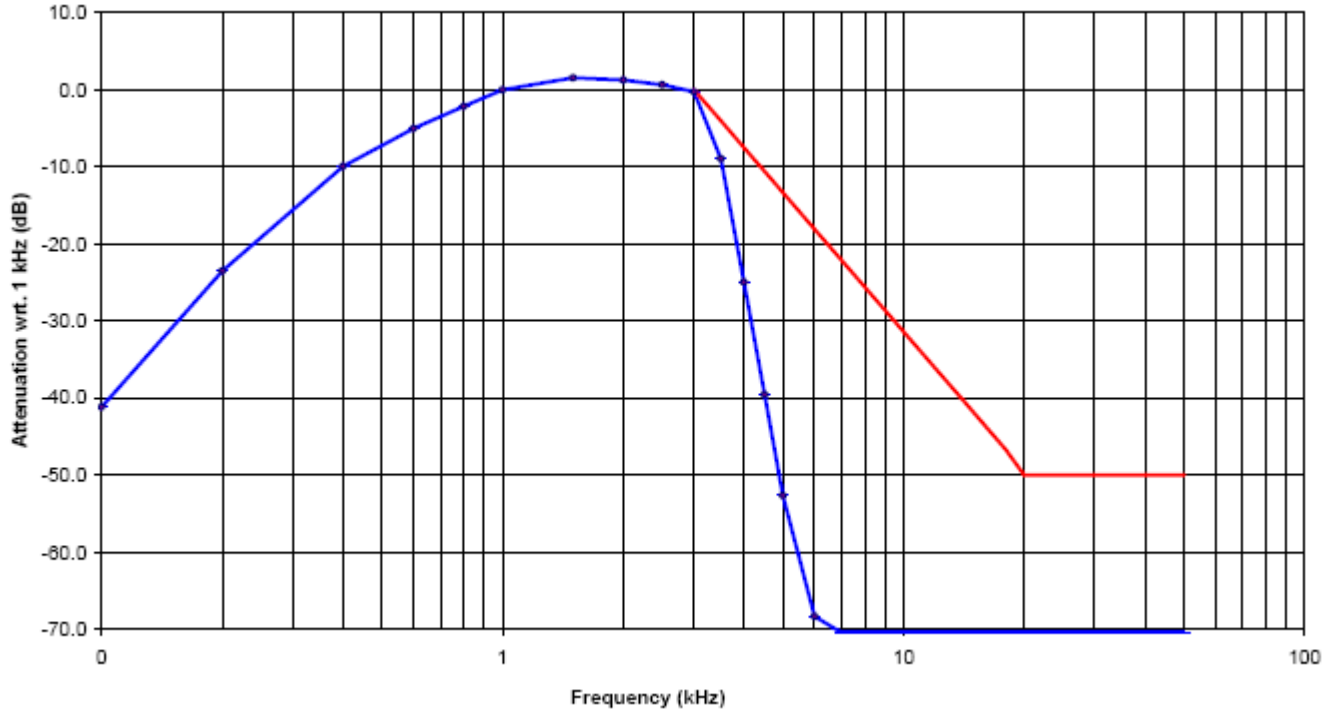
11.3 TEST DATA

Analog:

12.5 KHZ CHANNEL SPACING, F3E, FREQUENCY OF ALL MODULATION STATES (TEST RESULT FOR UHF)-5W

Frequency	Audio In	Audio out	Attenuation	Attenuation	Recommended Attenuation
(KHz)	(dBV)	(dBV)	(Out_In)	Rel.to 3 KHz	(dB)
			dB	（dB)	
0.1	-76.17	-31.21	46.38	-36.53	
0.2	-76.17	-17.38	58.25	-25.63	
0.4	-76.17	-6.29	71.65	-12.83	
0.6	-76.17	0.41	74.25	-6.43	
0.8	-76.17	4.17	78.95	-2.93	
1.0	-76.17	7.18	83.65	-0.03	
1.5	-76.17	8.27	84.85	2.16	
2.0	-76.17	8.99	85.35	1.57	
2.5	-76.17	7.52	83.85	0.67	
3.0	-76.17	6.27	82.55	-1.82	0
3.5	-76.17	2.63	78.45	-4.93	-4
4.0	-76.17	-2.3	74.65	-9.43	-7
4.5	-76.17	-9.21	68.25	-16.53	-12
5.0	-76.17	-15.17	60.65	-21.73	-15
6.0	-76.17	-21.23	54.15	-28.63	-18
7.0	-76.17	-31.61	46.25	-36.43	-22
8.0	-76.17	-39.22	37.95	-47.63	-26
9.0	-76.17	-61.95	15.15	-66.93	-28
10.0	-76.17	-61.95	15.15	-66.43	-31
12.0	-76.17	-61.95	15.15	-66.43	-37
14.0	-76.17	-61.95	15.15	-66.43	-40
16.0	-76.17	-61.95	15.15	-66.43	-44
18.0	-76.17	-61.95	15.15	-66.43	-47
20.0	-76.17	-61.95	15.15	-66.43	-49
25.0	-76.17	-61.95	15.15	-66.43	-49
30.0	-76.17	-61.95	15.15	-66.43	-49
35.0	-76.17	-61.95	15.15	-66.43	-49
40.0	-76.17	-61.95	15.15	-66.43	-49
45.0	-76.17	-61.95	15.15	-66.43	-49
50.0	-76.17	-61.95	15.15	-66.43	-49

***Note**: Due to the difficulty of measuring the Frequency Response of the internal low-pass filter, the Frequency Response of All Modulation States is performed to show the roll-off at 3 KHz in comparison with the recommended audio filter attenuation.*

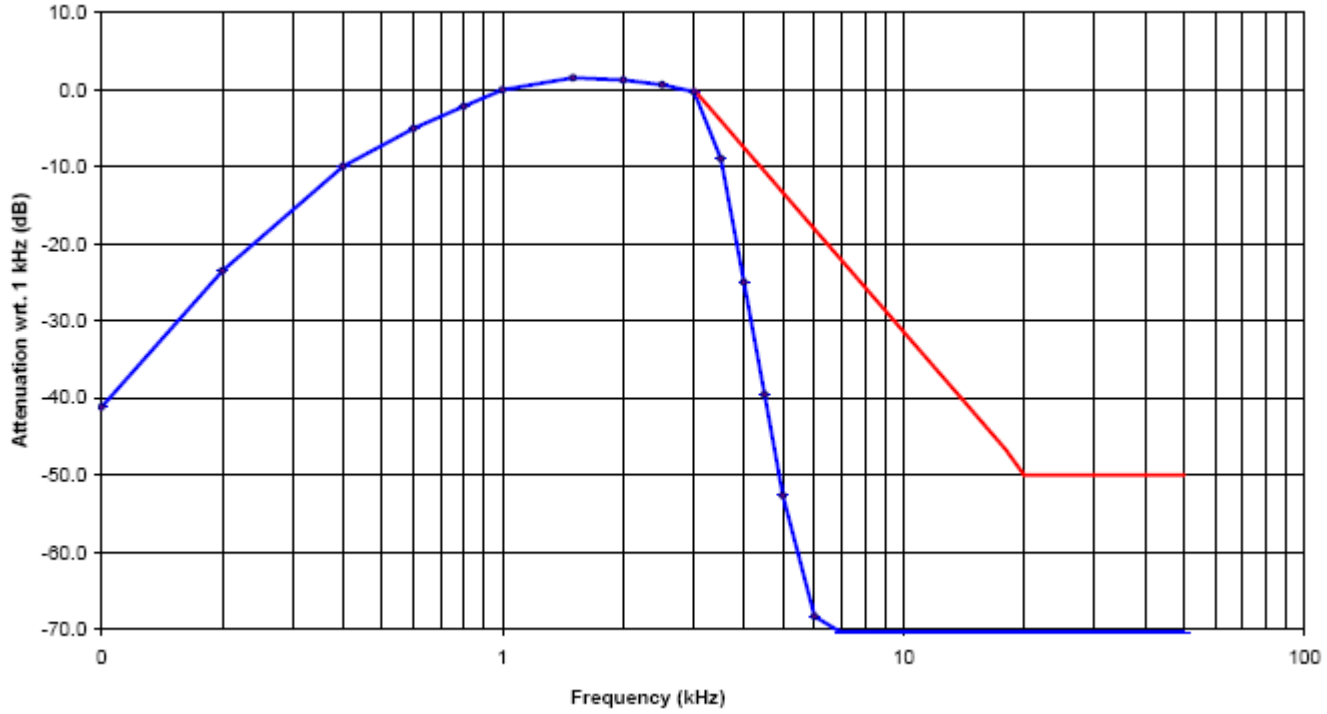


Digital：

12.5KHZ CHANNEL SPACING, F3E, FREQUENCY OF ALL MODULATION STATES (TEST RESULT FOR VHF)-5W

Frequency	Audio In	Audio out	Attenuation	Attenuation	Recommended Attenuation
(KHz)	(dBV)	(dBV)	(Out_In)	Rel.to 3 KHz	(dB)
			dB	（dB)	
0.1	-76.16	-31.22	46.39	-36.55	
0.2	-76.16	-17.37	58.26	-25.64	
0.4	-76.16	-6.28	71.67	-12.83	
0.6	-76.16	0.42	74.26	-6.43	
0.8	-76.16	4.16	78.96	-2.93	
1.0	-76.16	7.17	83.66	-0.03	
1.5	-76.16	8.26	84.86	2.16	
2.0	-76.16	8.98	85.36	1.57	
2.5	-76.16	7.51	83.86	0.67	
3.0	-76.16	6.26	82.56	-1.82	0
3.5	-76.16	2.64	78.46	-4.94	-4
4.0	-76.16	-2.31	74.66	-9.44	-7
4.5	-76.16	-9.22	68.26	-16.54	-12
5.0	-76.16	-15.16	60.66	-21.74	-15
6.0	-76.16	-21.22	54.16	-28.64	-18
7.0	-76.16	-31.62	46.26	-36.44	-22
8.0	-76.16	-39.22	37.96	-47.64	-26
9.0	-76.16	-61.95	15.16	-66.94	-28
10.0	-76.16	-61.94	15.16	-66.44	-31
12.0	-76.16	-61.94	15.16	-66.44	-37
14.0	-76.16	-61.94	15.16	-66.44	-40
16.0	-76.16	-61.94	15.16	-66.44	-44
18.0	-76.16	-61.94	15.16	-66.44	-47
20.0	-76.16	-61.94	15.16	-66.44	-49
25.0	-76.16	-61.94	15.16	-66.44	-49
30.0	-76.16	-61.94	15.16	-66.44	-49
35.0	-76.16	-61.94	15.16	-66.44	-49
40.0	-76.16	-61.94	15.16	-66.44	-49
45.0	-76.16	-61.94	15.16	-66.44	-49
50.0	-76.16	-61.94	15.16	-66.44	-49

***Note**: Due to the difficulty of measuring the Frequency Response of the internal low-pass filter, the Frequency Response of All Modulation States is performed to show the roll-off at 3 KHz in comparison with the recommended audio filter attenuation.*



APPENDIX I: PHOTOGRAPHS OF SETUP

RADIATED EMISSION TEST SETUP

APPENDIX II: EXTERNAL VIEW OF EUT

TOTAL VIEW OF EUT

TOP VIEW OF EUT

BOTTOM VIEW OF EUT

FRONT VIEW OF EUT

BACK VIEW OF EUT

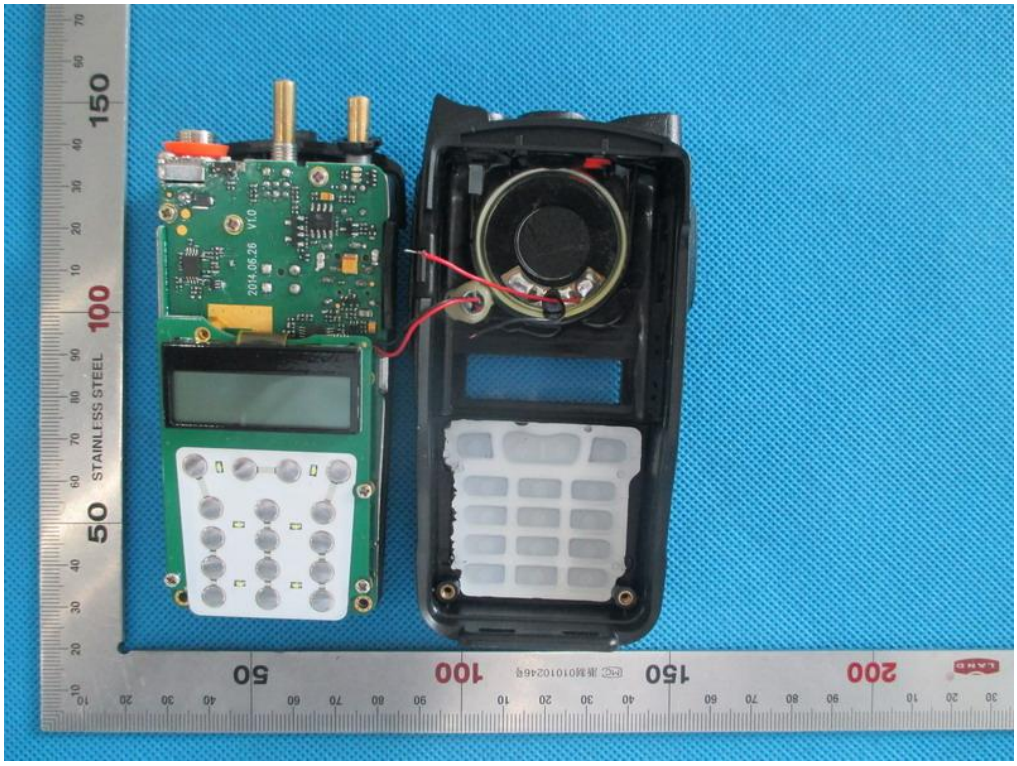
LEFT VIEW OF EUT

RIGHT VIEW OF EUT

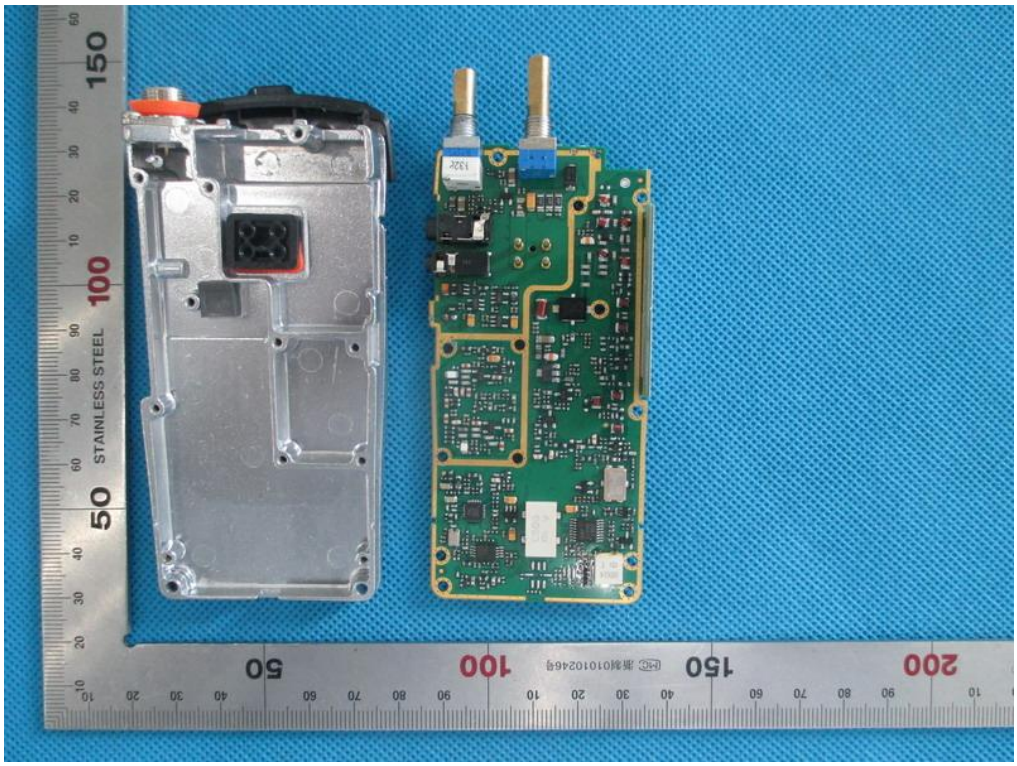
THE LABLE OF POWER ADAPTER MARKETED

OPEN VIEW-1 OF EUT

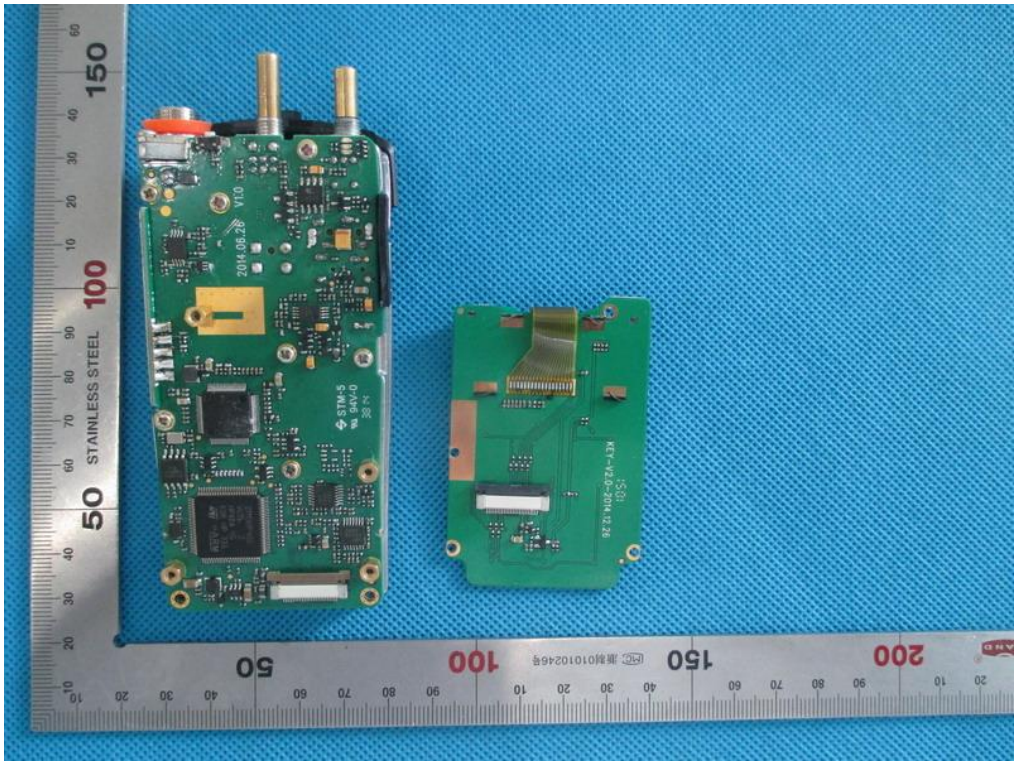
OPEN VIEW-2 OF EUT



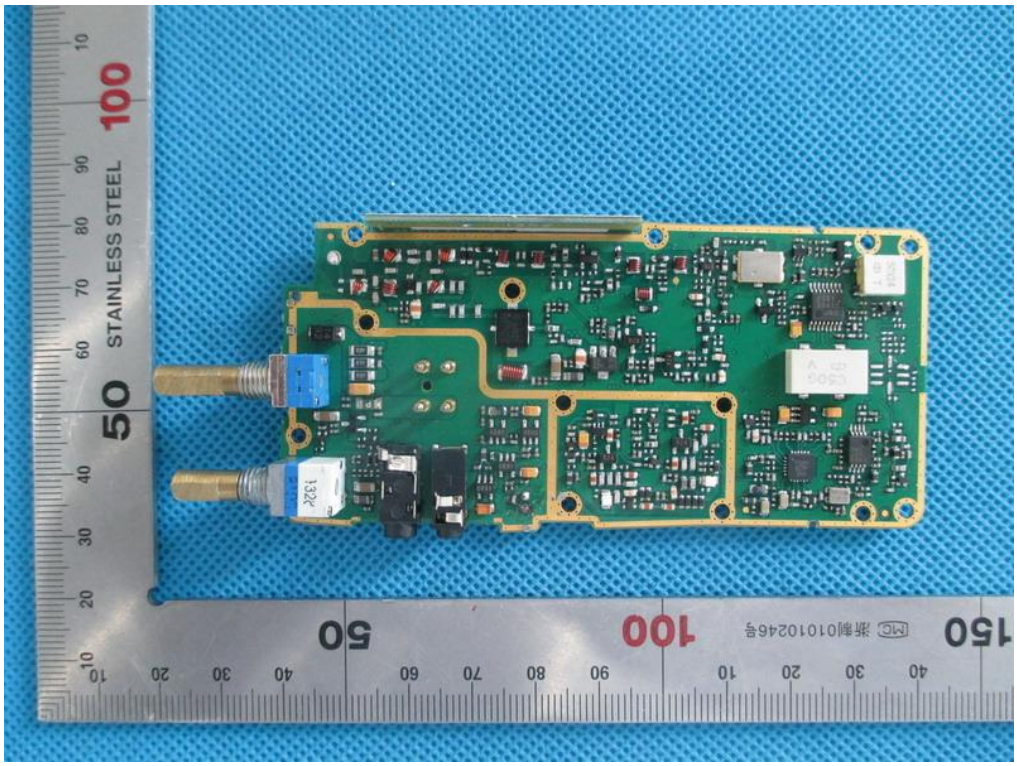
INTERNAL VIEW-1 OF EUT



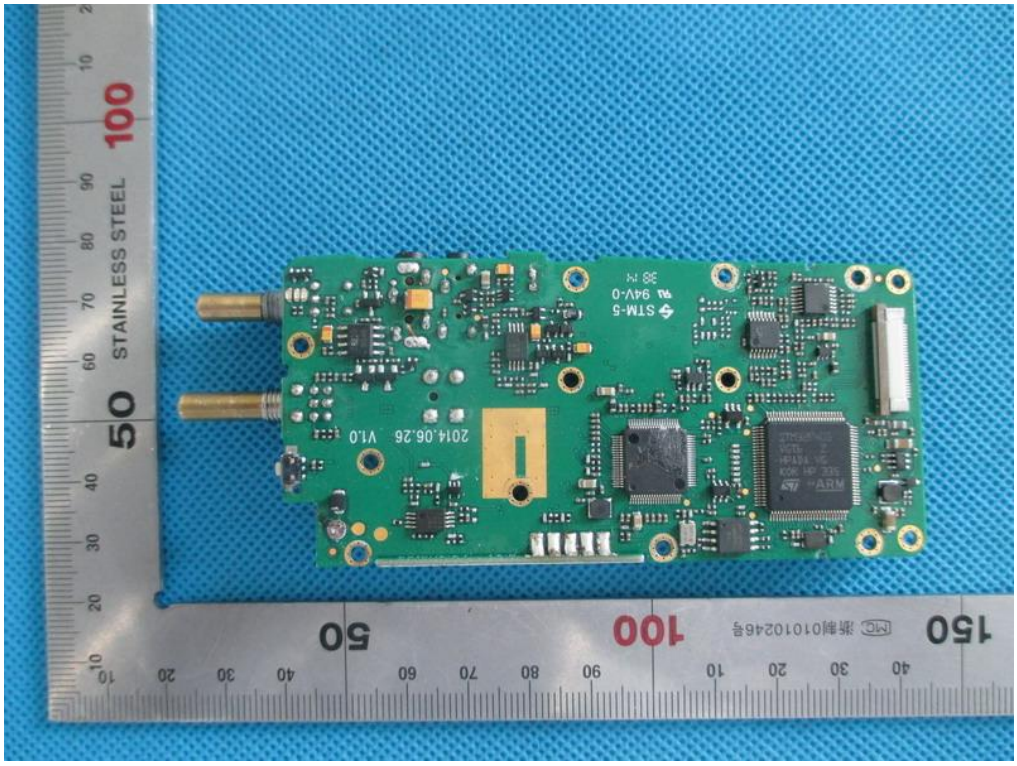
INTERNAL VIEW-2 OF EUT



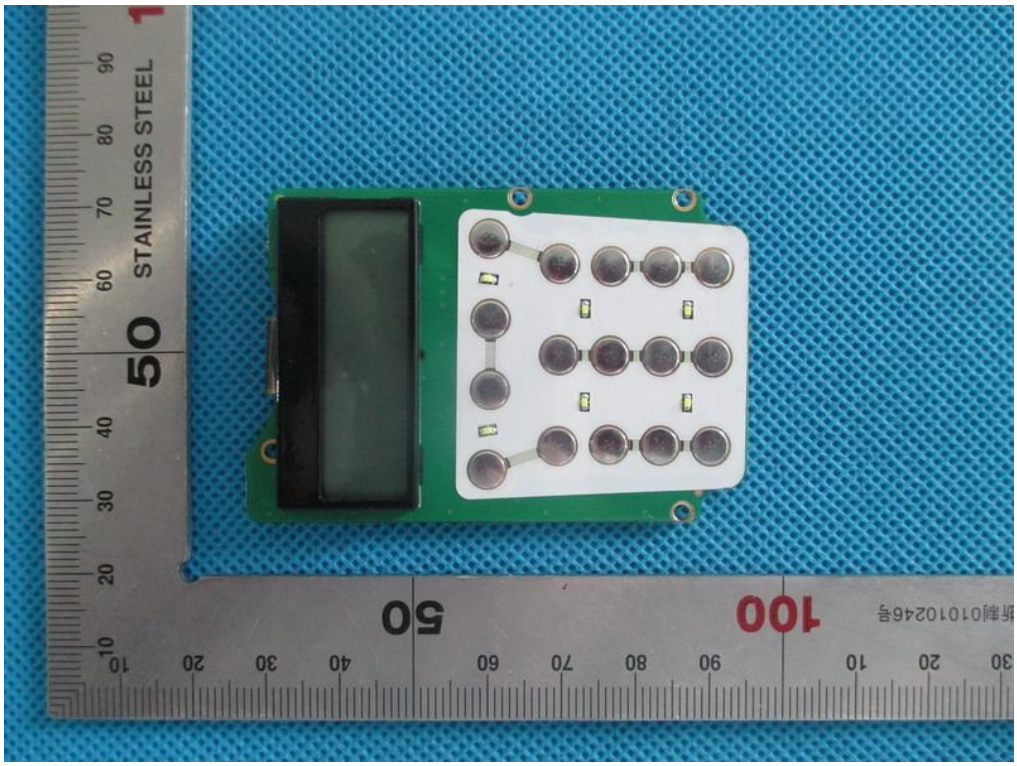
INTERNAL VIEW-3 OF EUT



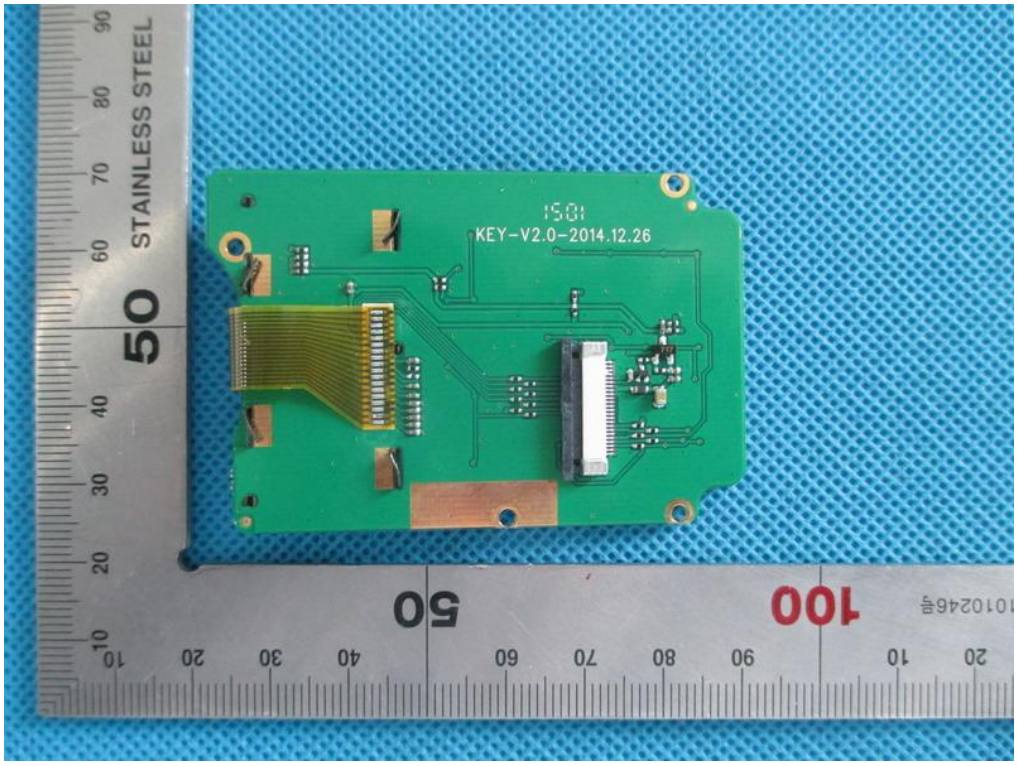
INTERNAL VIEW-4 OF EUT



INTERNAL VIEW-5 OF EUT



INTERNAL VIEW-6 OF EUT



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