

FCC PART 90 TEST REPORT

FCC Part 90

Report Reference No......: **TRE11120097**

FCC ID.....: **YAMPD70XG-VHF**

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Date of issue.....: Dec 29, 2011

Testing Laboratory Name: **Shenzhen Huatongwei International Inspection Co., Ltd**

Address: Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

Applicant's name: **Hytera Communications Corporation Ltd.**

Address: HYT Tower, Hi-Tech Industrial Park North, Nanshan District, Shenzhen China. 518057

Test specification:

Standard: **FCC Part 90: PRIVATE LAND MOBILE RADIO SERVICES**


TRF Originator.....: Shenzhen Huatongwei International Inspection CO., Ltd

Master TRF.....: Dated 2006-06

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Test item description: Digital Portable Radio

Trade Mark: 

Manufacturer: **Hytera Communications Corporation Ltd.**

Model/Type reference.....: PD702G VHF/ PD705G VHF/ PD706G VHF/ PD708G VHF/
 HD705G VHF

Listed Models: /

Ratings: DC 7.40 V

Modulation: FM&4FSK

Channel Separation.....: 12.5KHz

Rated Power: 5Watts(36.99dBm)/1Watts(30 dBm)

Operation Frequency Range.....: From 136 MHz to 174 MHz

Result.....: **Positive**

TEST REPORT

Test Report No. :	TRE11120097	Dec 29, 2011
		Date of issue

Equipment under Test : Digital Portable Radio

Model /Type : PD702G VHF/ PD705G VHF/ PD706G VHF/ PD708G VHF/HD705G VHF

Listed Models : /

Applicant : **Hytera Communications Corporation Ltd.**

Address : HYT Tower,Hi-Tech Industrial Park North,Nanshan District,Shenzhen China.518057

Manufacturer : **Hytera Communications Corporation Ltd.**

Address : HYT Tower,Hi-Tech Industrial Park North,Nanshan District,Shenzhen China.518057

Test Result according to the standards on page 4:	Positive
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1.	<u>TEST STANDARDS</u>	4
2.	<u>SUMMARY</u>	5
2.1.	General Remarks	5
2.2.	Product Description	5
2.3.	Equipment under Test	5
2.4.	Short description of the Equipment under Test (EUT)	6
2.5.	EUT Configuration	6
2.6.	EUT operation mode	6
2.7.	EUT configuration	6
2.8.	Related Submittal(s) / Grant (s)	6
2.9.	Modifications	6
2.10.	Note	7
3.	<u>TEST ENVIRONMENT</u>	8
3.1.	Address of the test laboratory	8
3.2.	Test Facility	8
3.3.	Environmental conditions	9
3.4.	Configuration of Tested System	9
3.5.	Discription of Tested Modes	9
3.6.	Statement of the measurement uncertainty	9
3.7.	Test Description	10
3.8.	Equipments Used during the Test	10
4.	<u>TEST CONDITIONS AND RESULTS</u>	12
4.1.	Conducted Emissions Test	12
4.2.	Occupied Bandwidth and Emission Mask Test	18
4.3.	Transmitter Radiated Spurious Emssion	30
4.4.	Spurious Emssion on Antenna Port	35
4.5.	Modulation Charcateristics	49
4.6.	Frequency Stability Test	52
4.7.	Maximum Transmitter Power	54
4.8.	Transmitter Frequency Behavior	61
4.9.	Receiver Radiated Spurious Emssion	64
4.10.	Receiver Conducted Spurious Emssion	74
5.	<u>TEST SETUP PHOTOS OF THE EUT</u>	78
6.	<u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT</u>	82

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 90: PRIVATE LAND MOBILE RADIO SERVICES.

TIA/EIA 603: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

ANSI C63.4-2009: American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

47 CFR FCC Part 15 Subpart B - Unintentional Radiators

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Dec 26, 2011
Testing commenced on	:	Dec 26, 2011
Testing concluded on	:	Dec 29, 2011

2.2. Product Description

The Hytera Communications Corporation Ltd.'s Model: PD702G VHF/ PD705G VHF/ PD706G VHF/ PD708G VHF/HD705G VHF or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Digital Portable Radio	
Model Number	PD702G VHF/ PD705G VHF/ PD706G VHF/ PD708G VHF/HD705G VHF	
FCC ID	YAMPD70XG-VHF	
Rated Output Power	5 Watts(36.99 dBm)/1 Watts(30.00 dBm)	
Modulation Type	FM for Analog Voice	
	4FSK for Digital Voice/Digital Data	
	4FSK for Digital Data	
	Analog	11K0F3E for 12.5KHz Channel Separation
Digital	7K60FXD for Digital Data only	
	7K60FXW for Digital Data & Digital Voice	
Channel Separation	Analog Voice	12.5KHz
	Digital Voice/Data	12.5KHz
	Digital Data	12.5KHz
Antenna Type	External	
Frequency Range	From 136 MHz to 174 MHz	
Maximum Output Power	Analog	<u>5.08 W</u> for 12.5 KHz Channel Separation
	Digital	<u>5.09 W</u> for 12.5 KHz Channel Separation

Note: The product has the same digital working characters when operating in both two digitized voice/data mode (7K60FXD and 7K60FXW). So only one set of test results for digital modulation modes are provided in this test report.

2.3. Equipment under Test

Power supply system utilised

Power supply voltage	:	<input type="radio"/> 120V / 60 Hz	<input type="radio"/> 115V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input checked="" type="radio"/> Other (specified in blank below)	

DC 7.40V from battery

Test frequency list

Modulation Type	Test Channel	Test Frequency
Analog/FM	Low Channel	136.5000 MHz
	Middle Channel	155.5000 MHz
	High Channel	173.5000 MHz
Digital/4FSK	Low Channel	136.5000 MHz
	Middle Channel	155.5000 MHz
	High Channel	173.5000 MHz

2.4. Short description of the Equipment under Test (EUT)

136-174 MHz V frequency band Digital Portable Radio with GPS function (PD702G VHF/ PD705G VHF/ PD706G VHF/ PD708G VHF/HD705G VHF).

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

2.5. 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.

2.6. 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.

2.7. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- supplied by the manufacturer
- supplied by the lab

<input type="radio"/>	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
<input type="radio"/>	Multimeter	Manufacturer :	/
		Model No. :	/

2.8. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **YAMPD70XG-VHF** filing to comply with FCC Part 90 Rules.

2.9. Modifications

No modifications were implemented to meet testing criteria.

2.10. Note

1. The EUT is is a V frequency band (136-174MHz) Digital Portable Radio with GPS function,The functions of the EUT listed as below:

	Test Standards	Reference Report
Radio	FCC Part 90	TRE11120097

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Huatongwei International Inspection Co., Ltd
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 22.

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: August 02, 2007. Valid time is until March 29, 2012.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept 30, 2013.

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 662850, Renewal date July 01, 2009.

IC-Registration No.: 5377

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377 on Jan 25, 2011. Valid time is until Jan 24, 2014

ACA

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

NEMKO-Aut. No.: ELA125

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025:2005 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10; the Authorization is valid through July 07, 2013.

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2484. Date of Registration: December 20, 2009. Valid time is until December 19, 2012.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: December 20, 2009. Valid time is until December 19, 2012.

DNV

Shenzhen Huatongwei International Inspection Co Ltd has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025(2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug 24, 2013.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

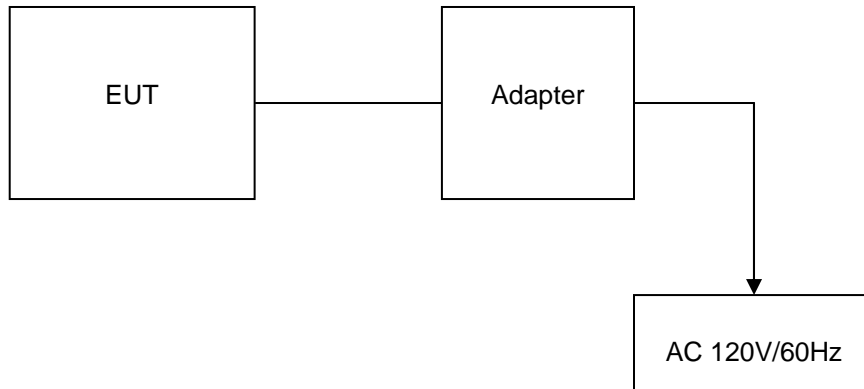


Table 2-1 Equipment Used in Tested System

Adapter: P/N: PS1014
 Model: DSA-15P-12 US 120120
 Input:100-240V~50/60Hz 0.5A
 Output: +12V DC 1A
 Power Cable: 180cm
 ◇ Shielded ◆ Unshielded

3.5. Discription of Tested Modes

The EUT (Didital Portable Radio) has been tested under normal operating condition. Three channels (the high, the middle and the low) are chosen for testing at each channel separation (12.5 KHz).

3.6. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Frequency stability	150 Hz	(1)
Transmitter power conducted	0.30 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-12.75 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-12.75 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emissio 1~18GHz	5.16 dB	(1)
Radiated Emissio 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	-----	(1)
Emission Mask	-----	(1)
Modulation Characteristic	-----	(1)
Transmitter Frequency Behavior	-----	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.7. Test Description

FCC Rules	Description of Test	Test Result
§ 15.107	Conducted Emission	Complies
§ 15.109	Receiver Radiated Spurious Emssion	Complies
§ 15.109	Receiver Conducted Spurious Emssion	Complies
§ 90.205	Maximum Transmitter Power	Complies
§ 90.207	Modulation Characteristic	Complies
§ 90.209	Occupied Bandwidth	Complies
§ 90.210	Emission Mask	Complies
§ 90.213	Frequency Stability	Complies
§ 90.214	Transmitter Frequency Behavior	Complies
§ 90.210	Transmitter Radiated Spurious Emssion	Complies
§ 90.210	Spurious Emssion On Antenna Port	Complies

3.8. Equipments Used during the Test

AC Power Conducted Emission				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Artificial Mains	Rohde&Schwarz	ESH2-Z5	100028	10/23/2012
EMI Test Receiver	Rohde&Schwarz	ESCS 30	100038	10/23/2012
Pulse Limiter	Rohde&Schwarz	ESHSZ2	100044	10/23/2012
EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	10/23/2012

Modulation Characteristic				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Signal Generator	Rohde&Schwarz	SMT03	100059	10/23/2012
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	10/23/2012

Transmitter Radiated Spurious Emission & Occupied Bandwidth & Emission Mask & Receiver Radiated Spurious Emission				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Ultra-Broadband Antenna	Rohde&Schwarz	HL562	100015	10/23/2012
EMI Test Receiver	Rohde&Schwarz	ESI 26	100009	10/23/2012
RF Test Panel	Rohde&Schwarz	TS / RSP	335015/ 0017	N/A
HORN ANTENNA	Rohde&Schwarz	HF906	100039	10/23/2012
Turntable	ETS	2088	2149	N/A
Antenna Mast	ETS	2075	2346	N/A
EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	10/23/2012
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	10/23/2012
Spectrum Analyzer	Agilent	E4407B	MY44210775	23/10/2012

Frequency Stability				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Communication Test Set	HP	HP8920B	US35010135	10/23/2012
Signal Generator	Rohde&Schwarz	SMT03	100059	10/23/2012
Climate Chamber	ESPEC	EL-10KA	05107008	10/23/2012

Maximum Transmitter Power & Spurious Emission On Antenna Port				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Receiver	Rohde&Schwarz	ESI 26	100009	10/23/2012
Attenuator	R&S	ESH3-22	100449	10/23/2012
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	10/23/2012
High-Pass Filter	Anritsu	MP526B	6220875256	10/23/2012
High-Pass Filter	Anritsu	MP526D	6220878392	10/23/2012

Transient Frequency Behavior				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Signal Generator	Rohde&Schwarz	SMT03	100059	10/23/2012
Storage Oscilloscope	Tektronix	TDS3054B	B033027	10/23/2012
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	10/23/2012

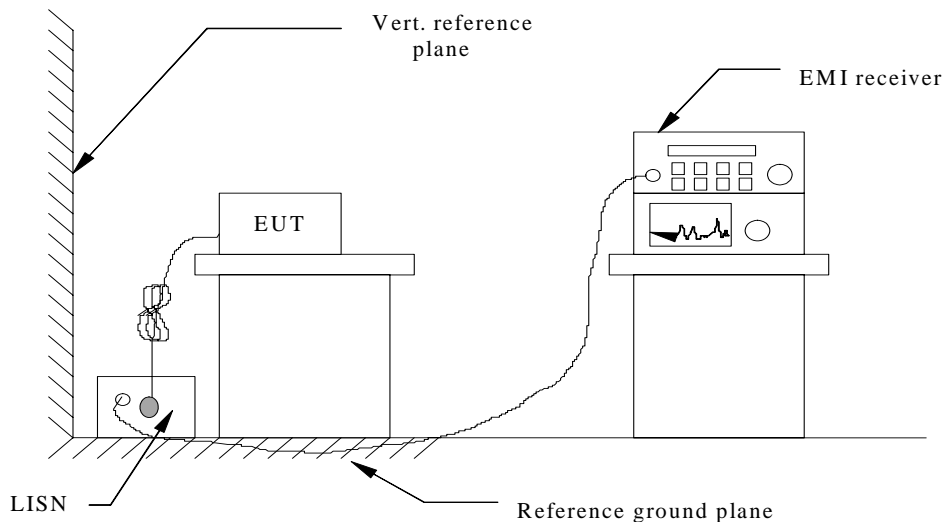
4. TEST CONDITIONS AND RESULTS

4.1. Conducted Emissions Test

TEST APPLICABLE

The EUT was tested according to ANSI C63.4 - 2009. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 u Henry as specified by section 5.1 of ANSI C63.4 - 2009. Cables and peripherals were moved to find the maximum emission levels for each frequency.

TEST CONFIGURATION



TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4-2009.
- 2 Support equipment, if needed, was placed as per ANSI C63.4-2009.
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4-2009.
- 4 If a EUT received DC power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

Conducted Power Line Emission Limit

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following :

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

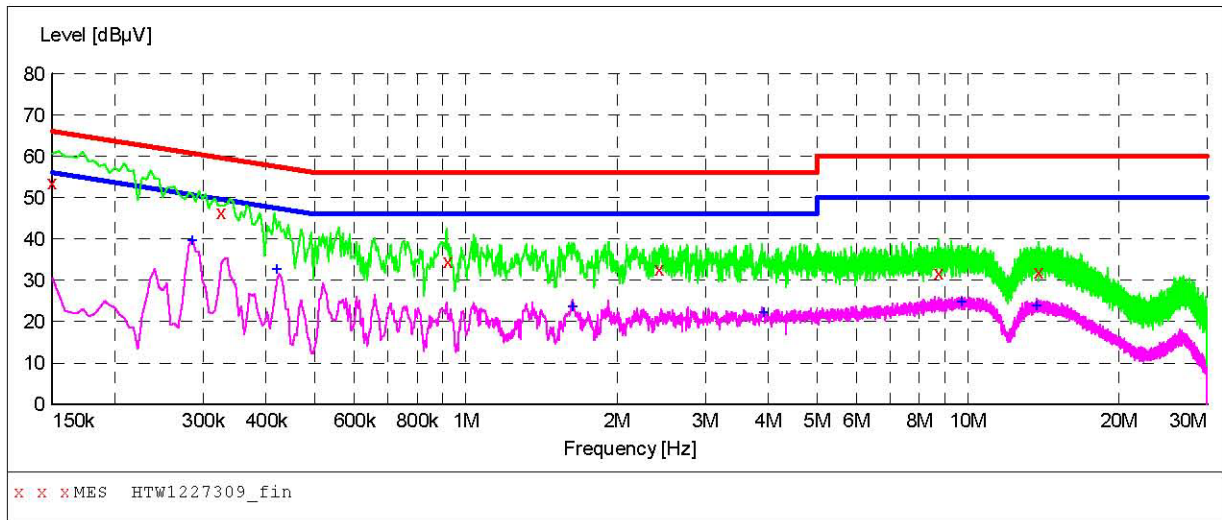
For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

TEST RESULTS

For FM Modulation @ 12.5 KHz

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW1227309_fin"

12/27/2011 9:33AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	53.60	10.1	66	12.4	QP	L1	GND
0.325500	46.40	10.1	60	13.2	QP	L1	GND
0.919500	34.60	10.1	56	21.4	QP	L1	GND
2.431500	32.80	10.2	56	23.2	QP	L1	GND
8.772000	31.80	10.3	60	28.2	QP	L1	GND
13.834500	32.10	10.3	60	27.9	QP	L1	GND

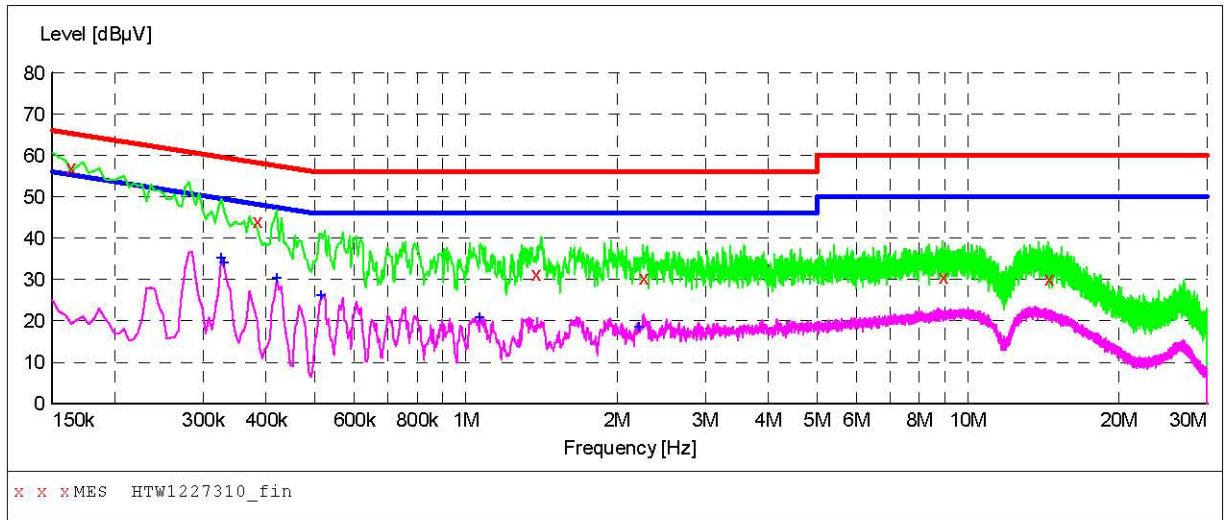
MEASUREMENT RESULT: "HTW1227309_fin2"

12/27/2011 9:33AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.285000	39.80	10.1	51	10.9	AV	L1	GND
0.420000	32.80	10.1	47	14.6	AV	L1	GND
1.630500	23.80	10.2	46	22.2	AV	L1	GND
3.925500	22.30	10.2	46	23.7	AV	L1	GND
9.708000	24.90	10.3	50	25.1	AV	L1	GND
13.731000	24.00	10.3	50	26.0	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW1227310_fin"

12/27/2011 9:36AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.163500	57.20	10.1	65	8.1	QP	N	GND
0.384000	44.10	10.1	58	14.1	QP	N	GND
1.378500	31.40	10.2	56	24.6	QP	N	GND
2.260500	30.60	10.2	56	25.4	QP	N	GND
8.947500	30.80	10.3	60	29.2	QP	N	GND
14.527500	30.30	10.3	60	29.7	QP	N	GND

MEASUREMENT RESULT: "HTW1227310_fin2"

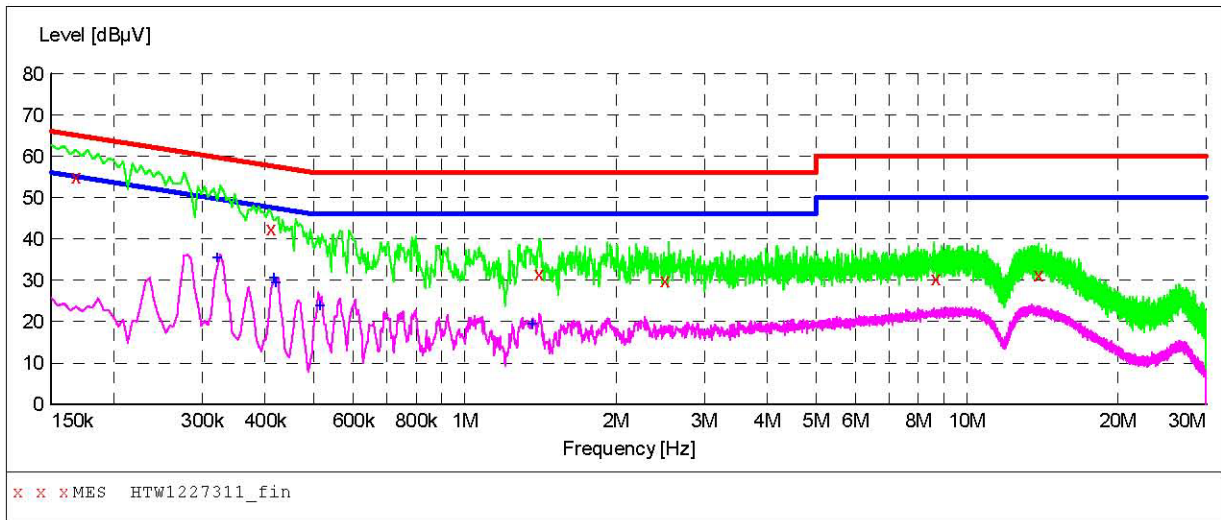
12/27/2011 9:36AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.325500	35.30	10.1	50	14.3	AV	N	GND
0.330000	34.10	10.1	50	15.4	AV	N	GND
0.420000	30.60	10.1	47	16.8	AV	N	GND
0.514500	26.30	10.1	46	19.7	AV	N	GND
1.063500	21.00	10.2	46	25.0	AV	N	GND
2.215500	18.70	10.2	46	27.3	AV	N	GND

For FSK Modulation @ 12.5 KHz

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW1227311_fin"

12/27/2011 9:39AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	55.00	10.1	65	10.1	QP	N	GND
0.411000	42.50	10.1	58	15.1	QP	N	GND
1.405500	31.60	10.2	56	24.4	QP	N	GND
2.503500	30.00	10.2	56	26.0	QP	N	GND
8.659500	30.40	10.3	60	29.6	QP	N	GND
13.915500	31.30	10.3	60	28.7	QP	N	GND

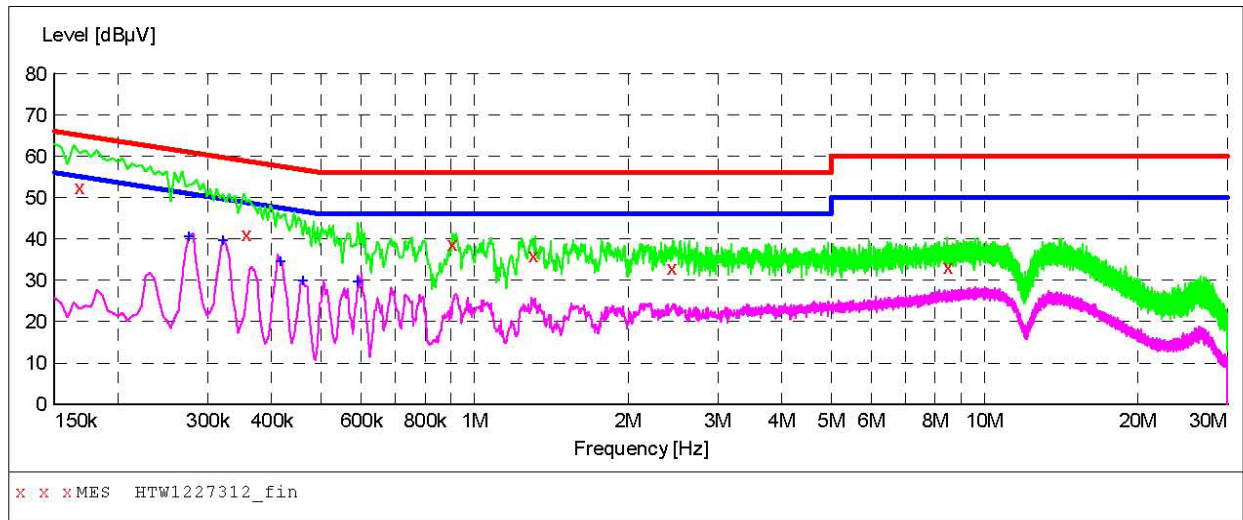
MEASUREMENT RESULT: "HTW1227311_fin2"

12/27/2011 9:39AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.321000	35.50	10.1	50	14.2	AV	N	GND
0.415500	30.80	10.1	48	16.7	AV	N	GND
0.420000	29.50	10.1	47	17.9	AV	N	GND
0.514500	24.00	10.1	46	22.0	AV	N	GND
1.360500	19.50	10.2	46	26.5	AV	N	GND

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW1227312_fin"

12/27/2011 9:42AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	52.60	10.1	65	12.5	QP	L1	GND
0.357000	41.10	10.1	59	17.7	QP	L1	GND
0.906000	38.90	10.1	56	17.1	QP	L1	GND
1.306500	36.10	10.2	56	19.9	QP	L1	GND
2.436000	33.00	10.2	56	23.0	QP	L1	GND
8.493000	33.30	10.3	60	26.7	QP	L1	GND

MEASUREMENT RESULT: "HTW1227312_fin2"

12/27/2011 9:42AM

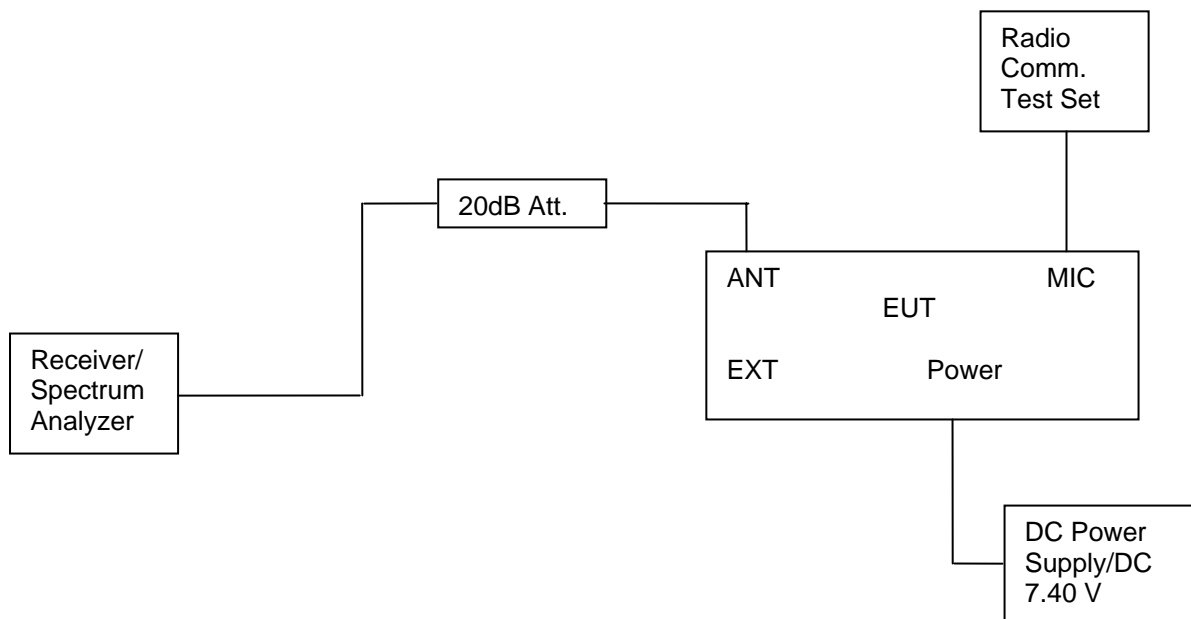
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.276000	40.70	10.1	51	10.2	AV	L1	GND
0.321000	39.70	10.1	50	10.0	AV	L1	GND
0.415500	34.70	10.1	48	12.8	AV	L1	GND
0.460500	30.00	10.1	47	16.7	AV	L1	GND
0.591000	29.90	10.1	46	16.1	AV	L1	GND

4.2. Occupied Bandwidth and Emission Mask Test

TEST APPLICABLE

- (a). 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.
- (b). 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.
- (c). Emission Mask D, 12.5 kHz channel bandwidth equipment: For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:
- (1) On any frequency from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0 : Zero dB.
 - (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least $7.27(f_d - 2.88 \text{ kHz})$ dB.
 - (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10 \log (P)$ dB or 70 dB, whichever is the lesser attenuation.

TEST CONFIGURATION



TEST 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) and 5 kHz (25 kHz channel spacing).
- 3 Set EUT as normal operation.
- 4 Set SPA Center Frequency = fundamental frequency, RBW=300Hz, VBW= 3 KHz, span =50 KHz.
- 5 Set SPA Max hold. Mark peak, Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.
- 6 Set SPA Center Frequency=fundamental frequency, RBW=300Hz, VBW=3 KHz span=50 KHz for 25 KHz channel spacing, while RBW=100Hz, VBW=300Hz, span=50 KHz for 12.5 channel spacing.

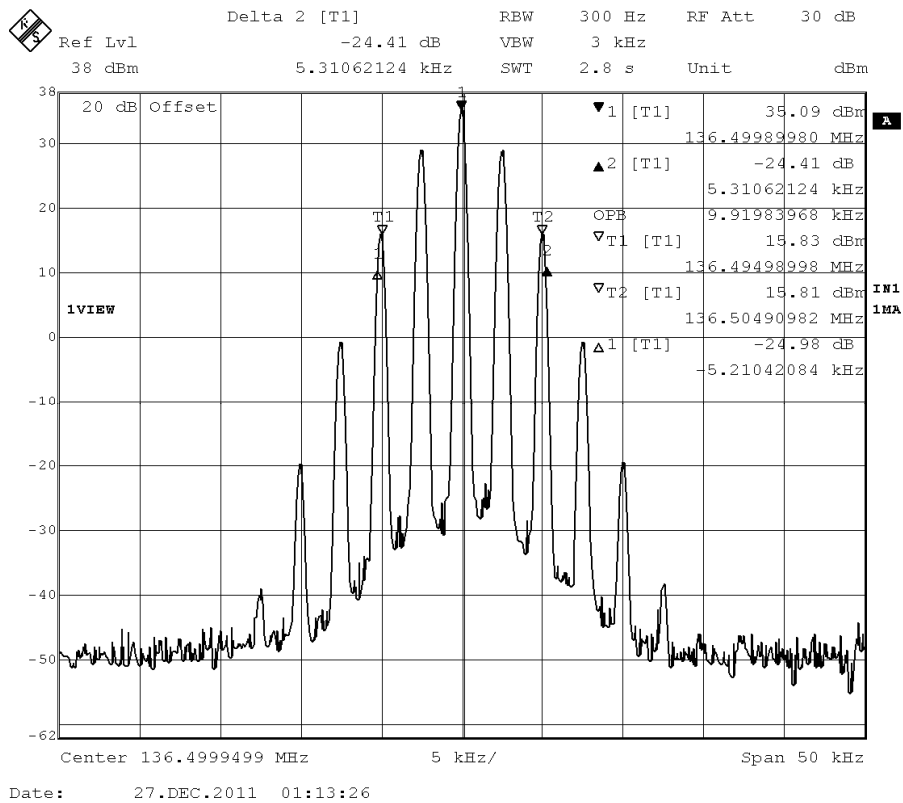
TEST RESULTS

4.2.1 Occupied Bandwidth

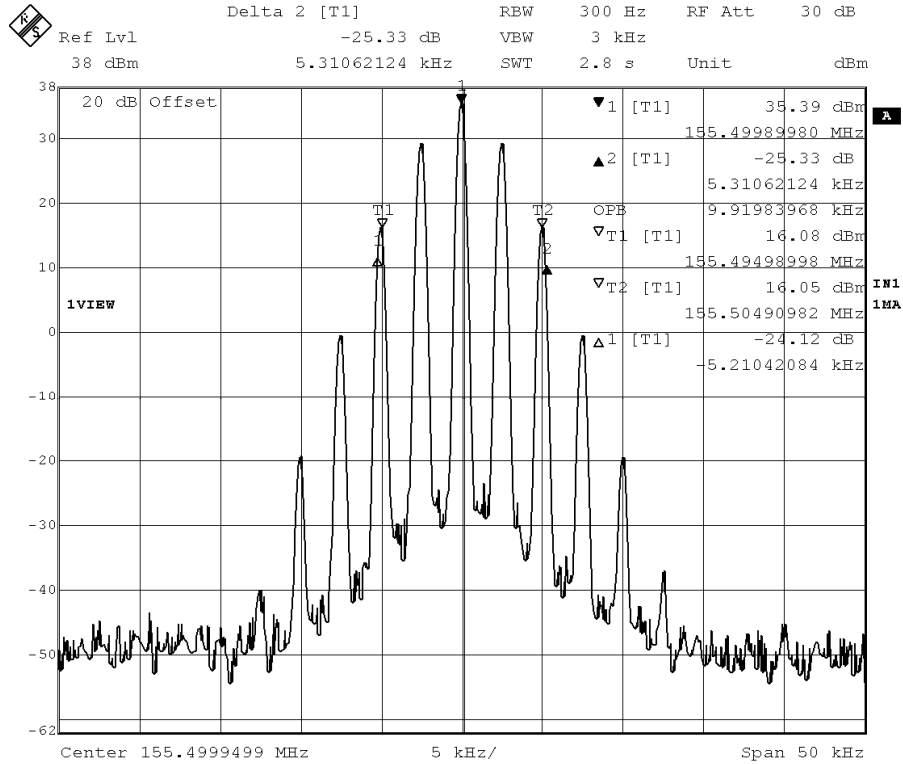
Modulation Type	Channel Separation	Test Channel	Test Frequency	99% Occupied Bandwidth	26dB Occupied Band width
FM	12.5KHz	Low	136.5000 MHz	9.92 KHz	10.52 KHz
		Middle	155.5000 MHz	9.92 KHz	10.52 KHz
		High	173.5000 MHz	9.92 KHz	10.52 KHz
4FSK	12.5KHz	Low	136.5000 MHz	7.11 KHz	9.82 KHz
		Middle	155.5000 MHz	6.91 KHz	9.92 KHz
		High	173.5000 MHz	7.01 KHz	8.82 KHz
Limit		11.25KHz for 12.5KHz Channel Separation			
Test Results		Compliance			

Plots of 99% and 26dB Bandwidth Measurement

Modulation Type	Channel Separation	Freq.(MHz)	99% Bandwidth (KHz)	26dB Bandwidth (KHz)	FCC Limit (KHz)	Results
FM	12.5 KHz	136.5000	9.92	10.52	11.25	Compliance

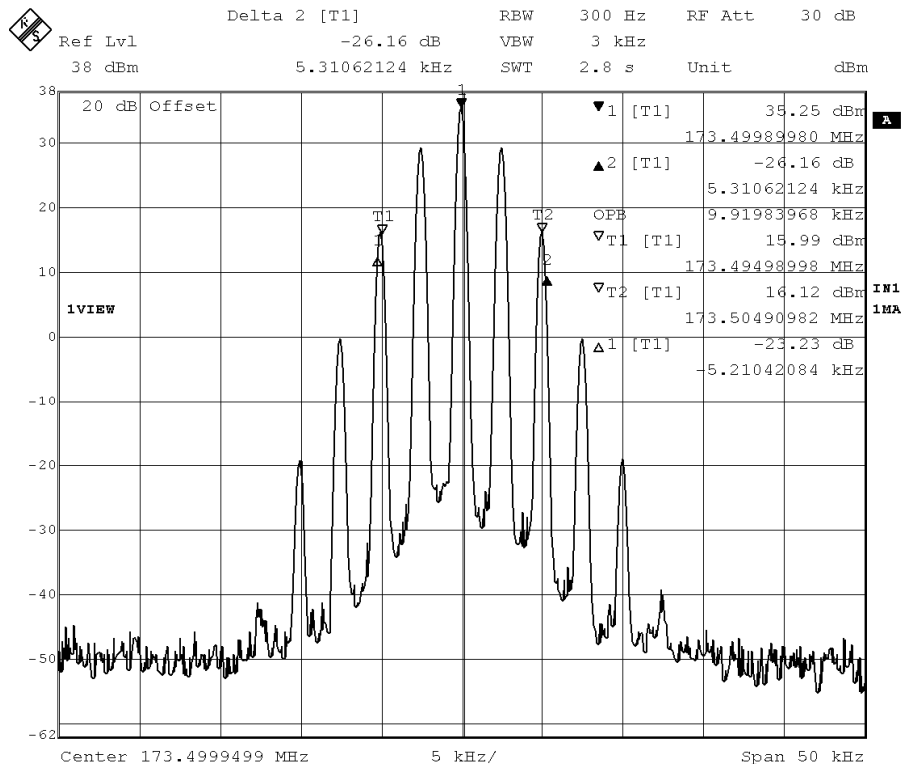


Modulation Type	Channel Separation	Freq.(MHz)	99% Bandwidth (KHz)	26dB Bandwidth (KHz)	FCC Limit (KHz)	Results
FM	12.5 KHz	155.5000	9.92	10.52	11.25	Compliance



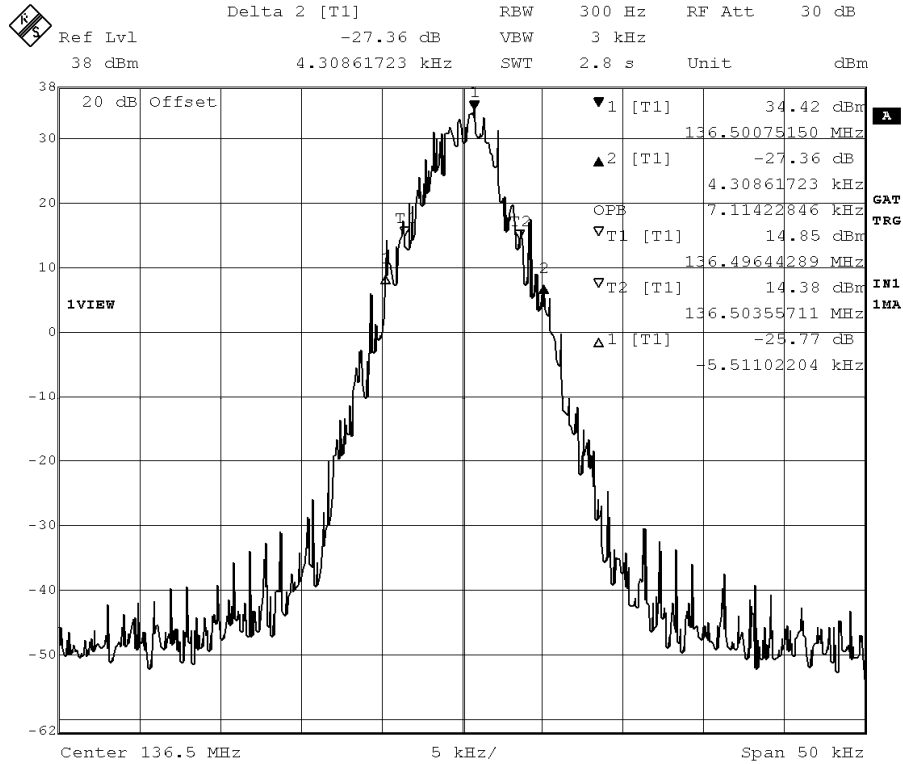
Date: 27.DEC.2011 01:02:03

Modulation Type	Channel Separation	Freq.(MHz)	99% Bandwidth (KHz)	26dB Bandwidth (KHz)	FCC Limit (KHz)	Results
FM	12.5 KHz	173.5000	9.92	10.52	11.25	Compliance



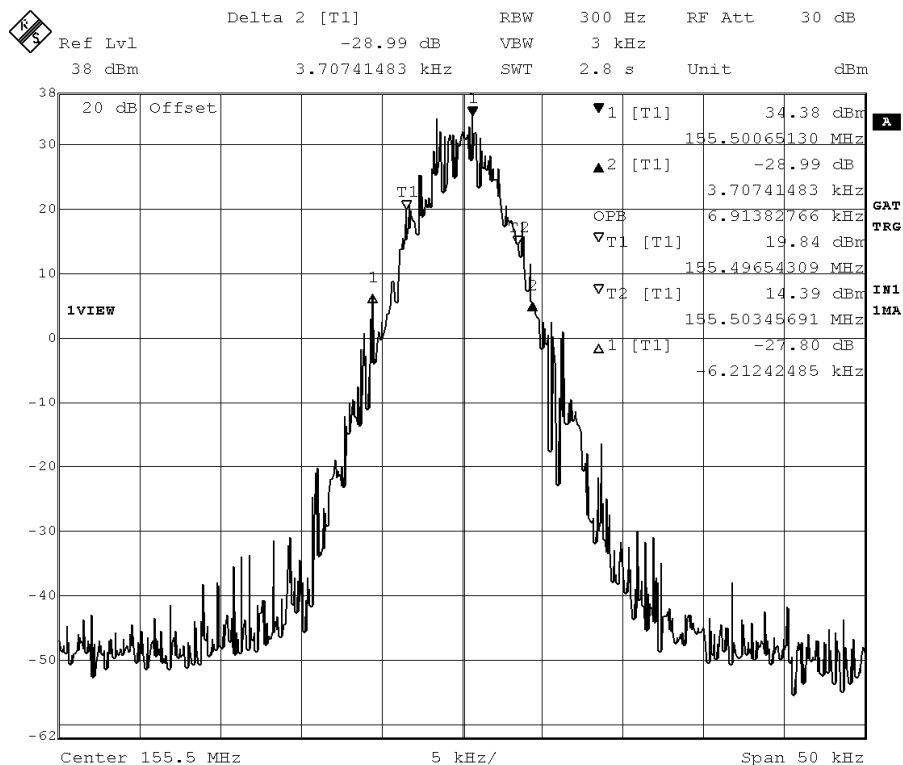
Date: 27.DEC.2011 01:04:03

Modulation Type	Channel Separation	Freq.(MHz)	99% Bandwidth (KHz)	26dB Bandwidth (KHz)	FCC Limit (KHz)	Results
4FSK	12.5 KHz	136.5000	7.11	9.82	11.25	Compliance



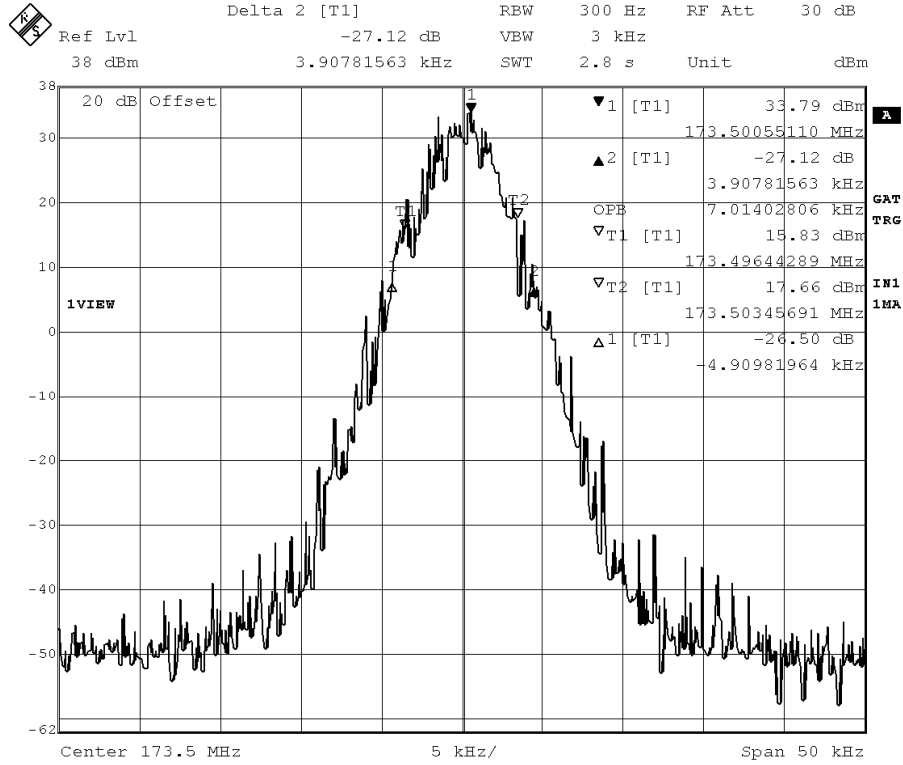
Date: 27.DEC.2011 01:07:29

Modulation Type	Channel Separation	Freq.(MHz)	99% Bandwidth (KHz)	26dB Bandwidth (KHz)	FCC Limit (KHz)	Results
4FSK	12.5 KHz	155.5000	6.91	9.92	11.25	Compliance



Date: 27.DEC.2011 01:09:49

Modulation Type	Channel Separation	Freq.(MHz)	99% Bandwidth (KHz)	26dB Bandwidth (KHz)	FCC Limit (KHz)	Results
4FSK	12.5 KHz	173.5000	7.01	8.82	11.25	Compliance



Date: 27.DEC.2011 01:11:15

4.2.2 Emission Mask

Modulation Type	Channel Sparation	Test Channel	Test Frequency	FCC Applicable Mask	RBW
FM	12.5KHz	Low	136.5000 MHz	D	100 Hz
		Middle	155.5000 MHz	D	100 Hz
		High	173.5000 MHz	D	100 Hz
4FSK	12.5KHz	Low	136.5000 MHz	D	100 Hz
		Middle	155.5000 MHz	D	100 Hz
		High	173.5000 MHz	D	100 Hz
Test Results		Compliance			

Plots of Emission Mask Measurement

Referred as the attached plot hereinafter

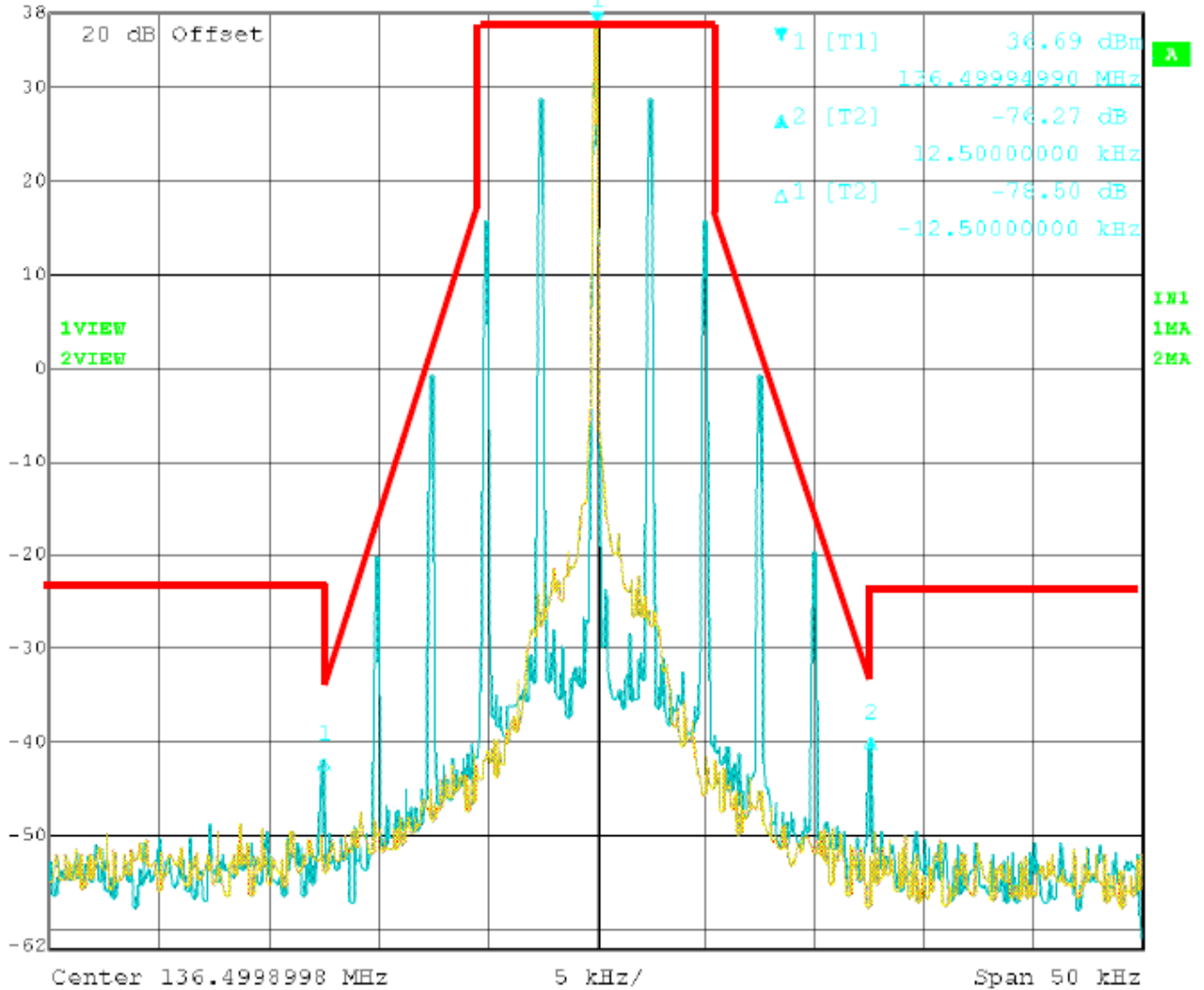
Note: The yellow curve represents unmodulated signal.

The green curve represents modulated signal.

Modulation Type	Channel Separation	Freq.(MHz)	FCC Applicable Mask	RBW	Audio Freq. (KHz)	Results
FM	12.5 KHz	136.5000	D	100Hz	2.5	Compliance



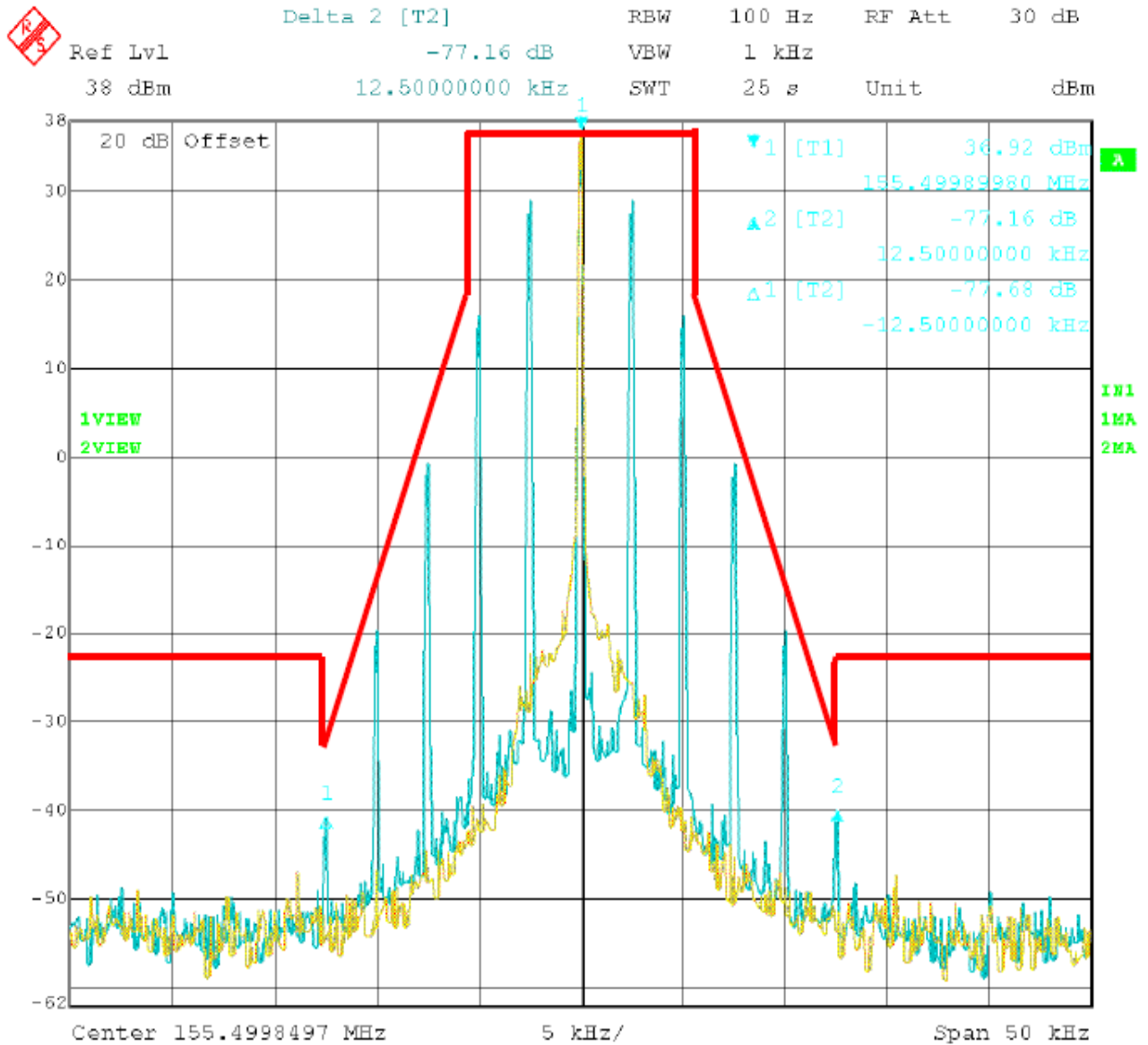
Delta 2 [T2] RBW 100 Hz RF Att 30 dB
Ref Lvl -76.27 dB VBW 1 kHz
38 dBm 12.50000000 kHz SWT 25 s Unit dBm



Date: 27.DEC.2011 01:17:33

12.5 kHz Channel Spacing, 136.5000 MHz, 2500 Hz Audio Modulation Only

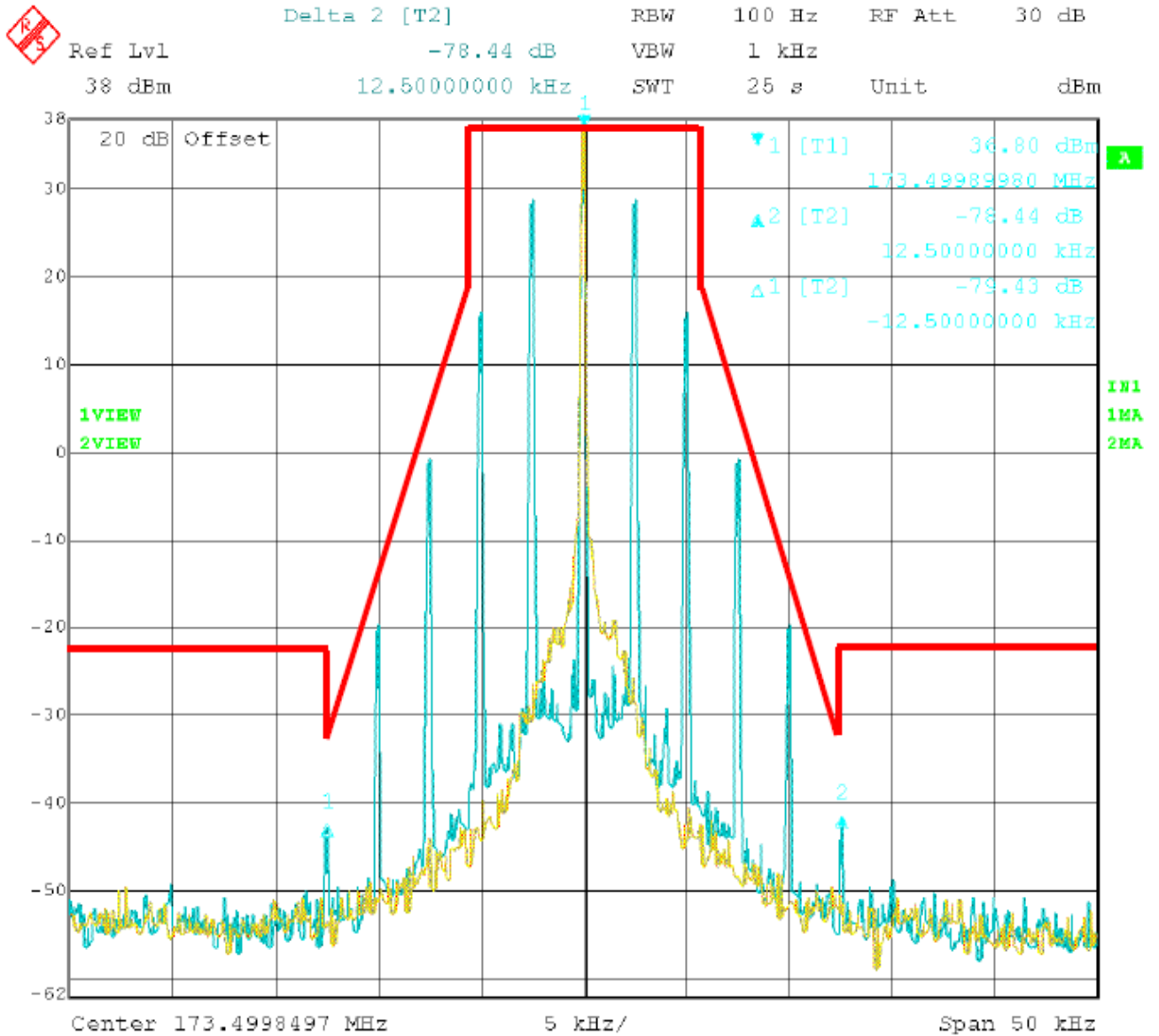
Modulation Type	Channel Separation	Freq.(MHz)	FCC Applicable Mask	RBW	Audio Freq. (KHz)	Results
FM	12.5 KHz	155.5000	D	100Hz	2.5	Compliance



Date: 27.DEC.2011 01:22:08

12.5 kHz Channel Spacing, 155.5000 MHz, 2500 Hz Audio Modulation Only

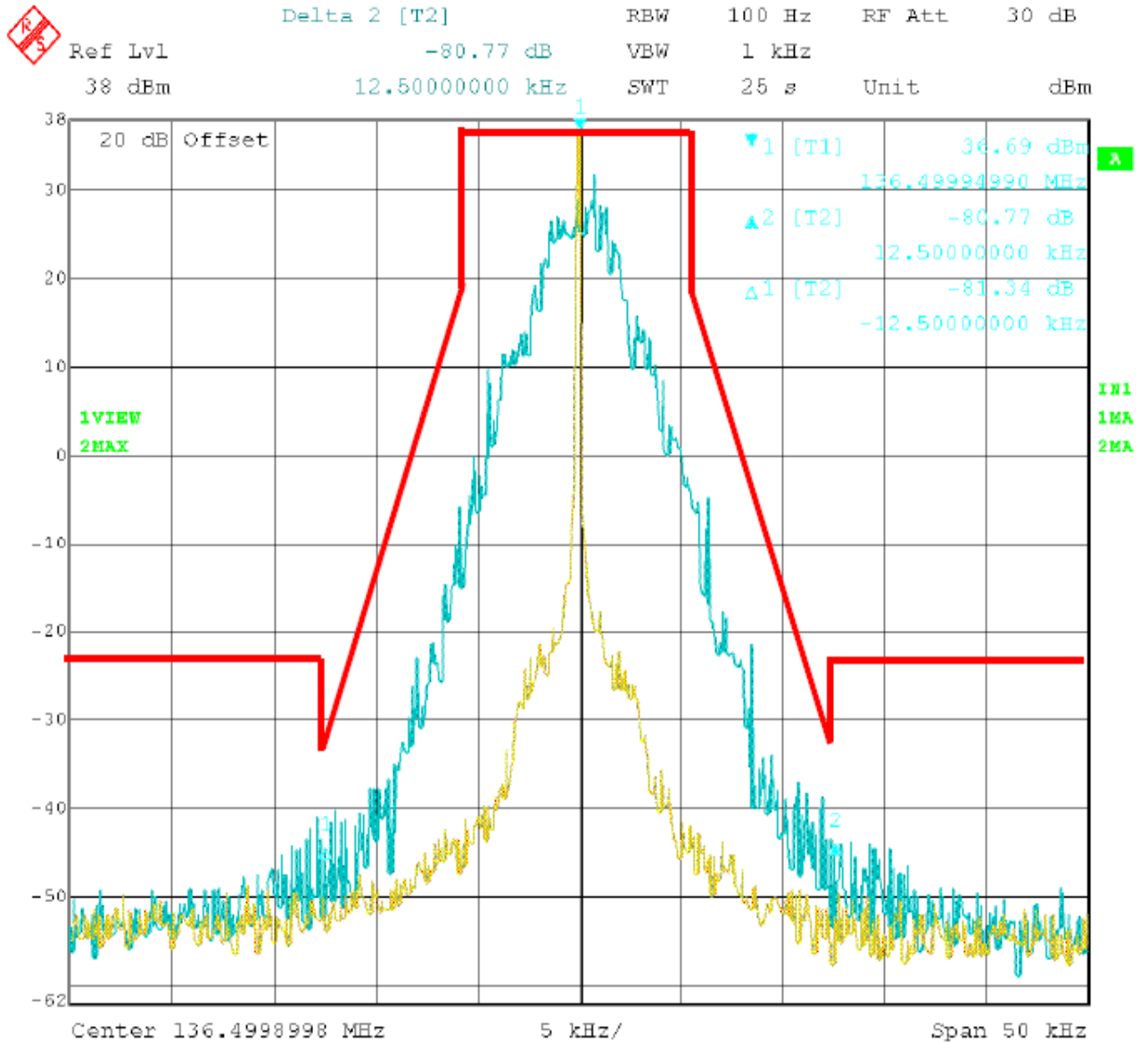
Modulation Type	Channel Separation	Freq.(MHz)	FCC Applicable Mask	RBW	Audio Freq. (KHz)	Results
FM	12.5 KHz	173.5000	D	100Hz	2.5	Compliance



Date: 27.DEC.2011 01:27:27

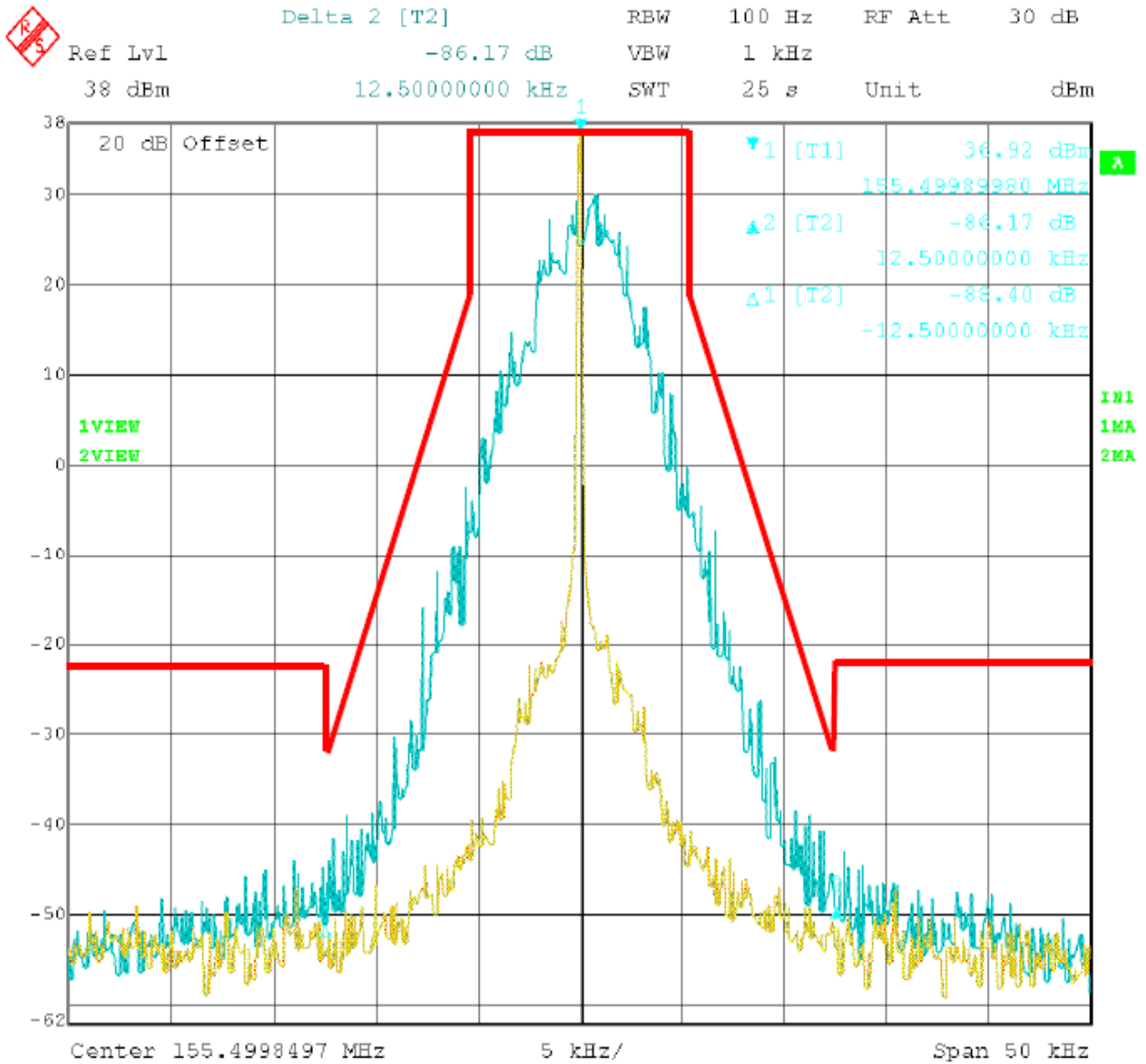
12.5 kHz Channel Spacing, 173.5000 MHz, 2500 Hz Audio Modulation Only

Modulation Type	Channel Separation	Freq.(MHz)	FCC Applicable Mask	RBW	Audio Freq. (KHz)	Results
4FSK	12.5 KHz	136.5000	D	100Hz	/	Compliance



12.5 kHz Channel Spacing, 136.5000 MHz, 4FSK Modulation Only

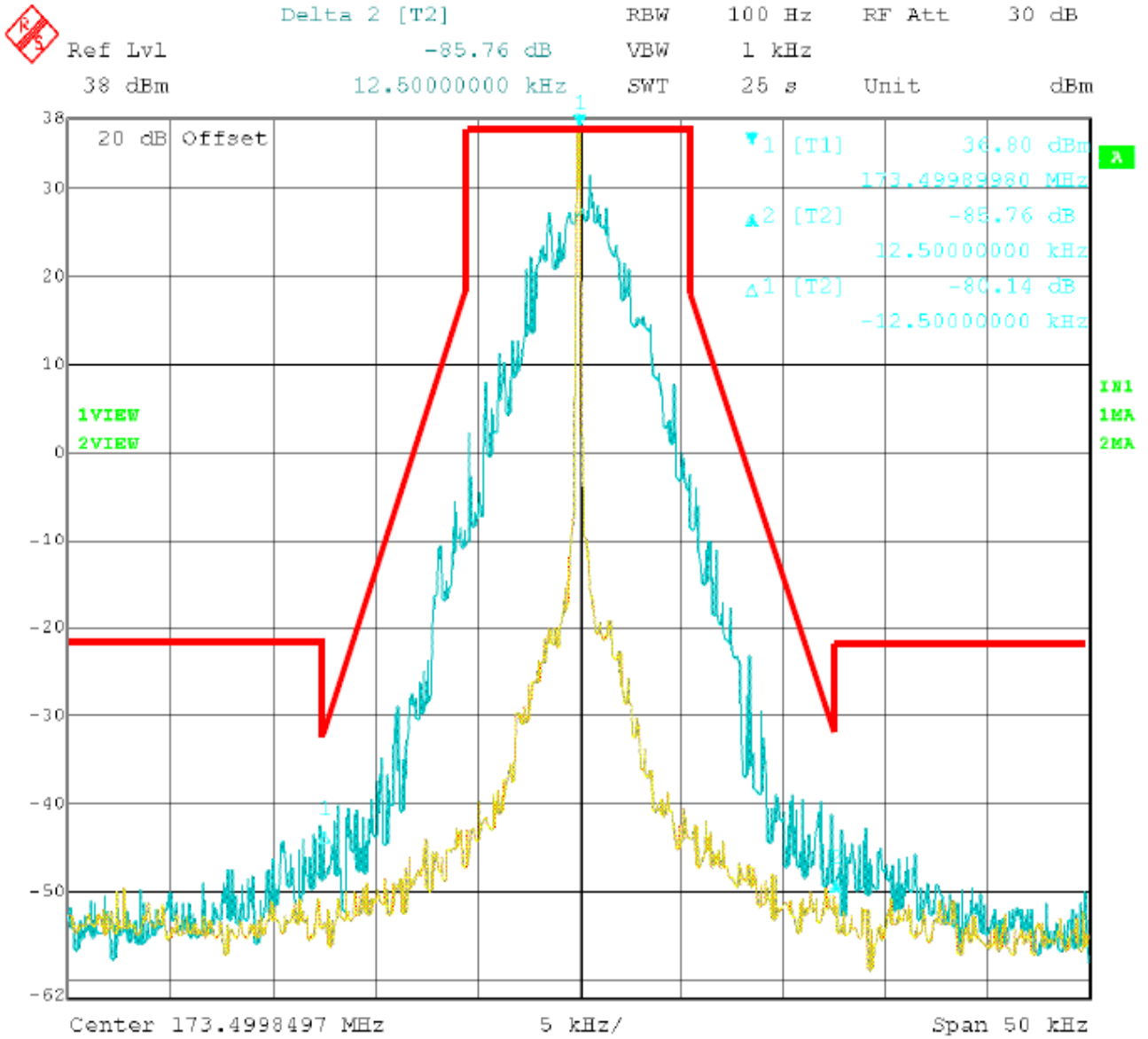
Modulation Type	Channel Separation	Freq.(MHz)	FCC Applicable Mask	RBW	Audio Freq. (KHz)	Results
4FSK	12.5 KHz	155.5000	D	100Hz	/	Compliance



Date: 27.DEC.2011 01:23:24

12.5 kHz Channel Spacing, 155.5000 MHz, 4FSK Modulation Only

Modulation Type	Channel Separation	Freq.(MHz)	FCC Applicable Mask	RBW	Audio Freq. (KHz)	Results
4FSK	12.5 KHz	173.5000	D	100Hz	/	Compliance



Date: 27.DEC.2011 01:28:48

12.5 kHz Channel Spacing, 173.5000 MHz, 4FSK Modulation Only

4.3. Transmitter Radiated Spurious Emission

TEST APPLICABLE

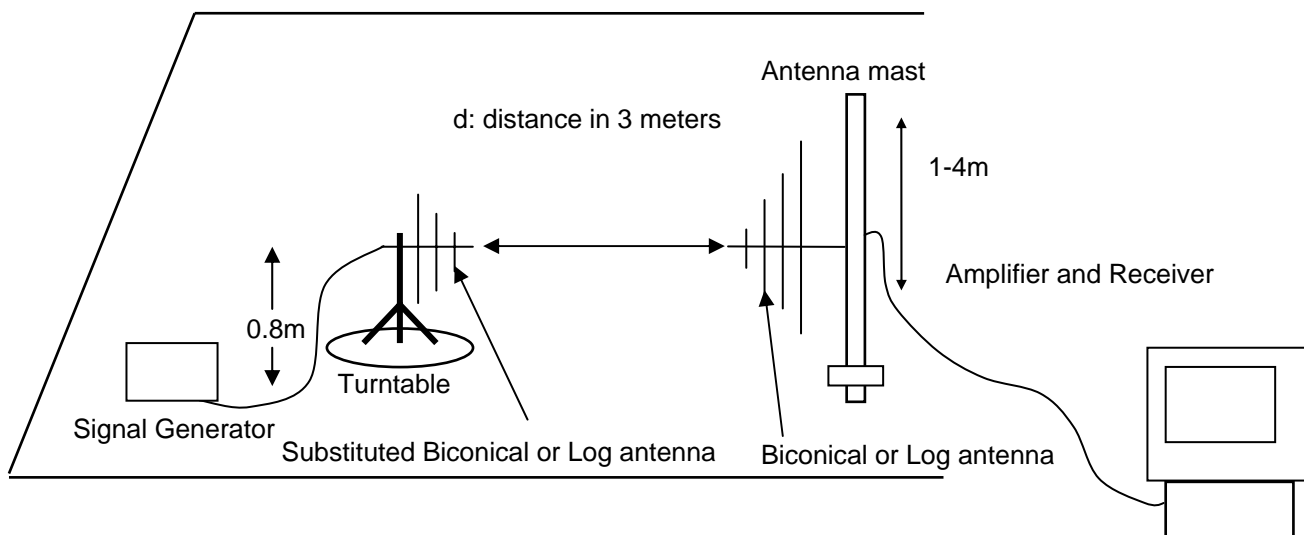
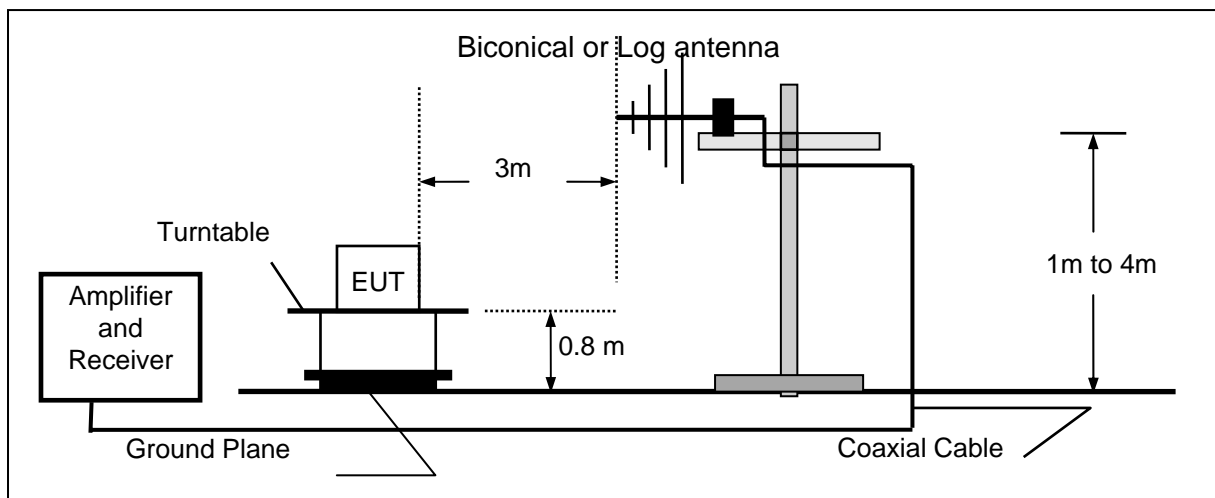
According to the TIA/EIA 603 test method, and according to Section 90.210, the power of each unwanted emission shall be less than Transmitted Power as specified below for transmitters designed to operate with 12.5 KHz channel bandwidth:

- 1 On any frequency removed from the center of the authorized bandwidth f_0 to 5.625 KHz removed from f_0 : Zero dB
 - 2 On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in KHz) f_0 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 (f_d in KHz) f_0 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:

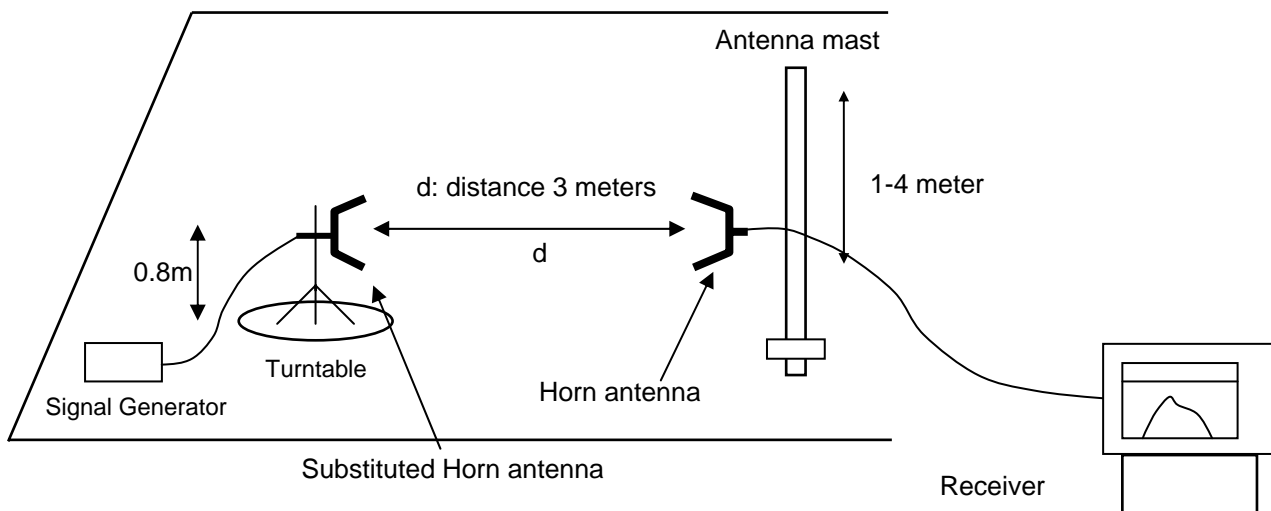
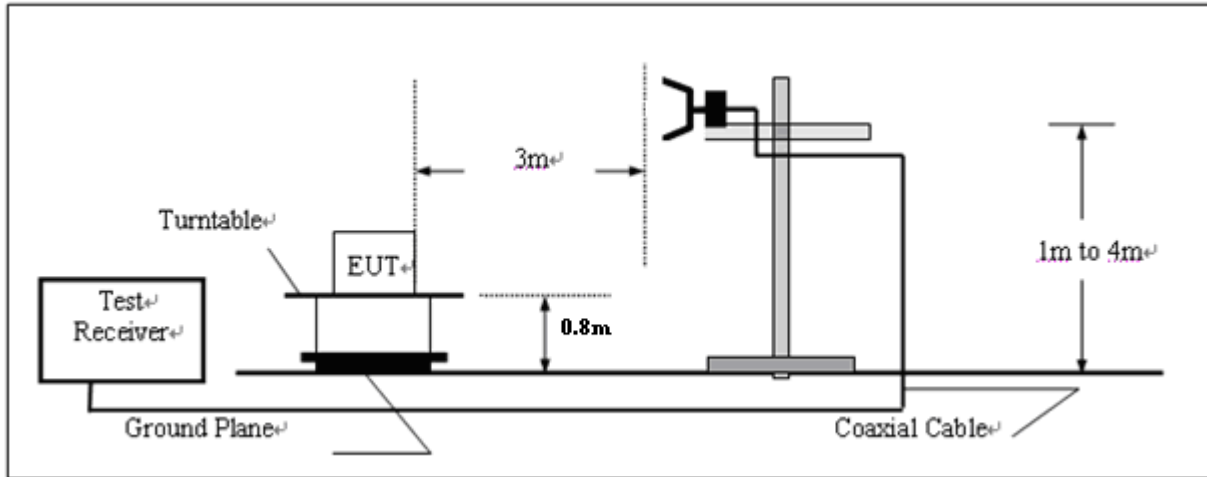
- 1 On any frequency removed from the assigned frequency by more than 50 percent, but no more than 100 percent of the authorized bandwidth: At least 25 dB.
- 2 On any frequency removed from the assigned frequency by more than 100 percent, but no more than 250 percent of the authorized bandwidth: At least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

TEST CONFIGURATION

Below 1GHz



Above 1GHz

**TEST 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 then 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

TEST RESULTS

The Transmitter Radiated Spurious Emission was performed to the Rated high power (5Watt) and Rated low power (1Watt) the datum that reported below is the worst case (Rated high power) of the two rated power conditions.

Modulation Type: FM

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue 11 (12.5 kHz bandwidth only): On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f d in kHz) of more than 12.5 kHz at least:

Low: $50 + 10 \log (P_{\text{watts}}) = 50 + 10 \log (5.01) = 56.99 \text{ dB}$

High: $50 + 10 \log (P_{\text{watts}}) = 50 + 10 \log (5.08) = 57.06 \text{ dB}$

Note: In general, the worse case attenuation requirement shown above was applied.

Calculation: Limit (dBm) = EL-50-10log10 (TP)

Notes: EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is 36.99 dBm.
Limit (dBm) = $36.99 - 50 - 10 \log_{10} (5.08) = -20 \text{ dBm}$

Modulation Type: 4FSK

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue11 (12.5 kHz Bandwidth only): On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f d in kHz) of more than 12.5 kHz at least:

Low: $50 + 10 \log (P_{\text{watts}}) = 50 + 10 \log (5.03) = 57.02 \text{ dB}$

High: $50 + 10 \log (P_{\text{watts}}) = 50 + 10 \log (5.09) = 57.07 \text{ dB}$

Note: In general, the worse case attenuation requirement shown above was applied.

Calculation: Limit (dBm) = EL-50-10log10 (TP)

Notes: EL is the emission level of the Output Power expressed in dBm,
In this application, the EL is 36.99 dBm.
Limit (dBm) = $36.99 - 50 - 10 \log_{10} (5.75) = -20 \text{ dBm}$

Note: 1. In general, the worse case attenuation requirement shown above was applied.

2. The measurement frequency range from 30 MHz to 2 GHz.

3. *** means that the emission level is too low to be measured or at least 20 dB down than the limit.

Modulation		FM		Channel Separation		12.5KHz		
Test Channel		Low Channel		Test Frequency		136.5000 MHz		
Frequency (MHz)	E-Field Level (dBuV/m)	EMI Detector (Peak/QP)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	ERP measured by Substitution Method (dBm)	Limit (dBm)	Margin (dB)
409.5000	54.26	Peak	H	341	312	-42.51	-20	24.51
546.0000	55.76	Peak	H	125	56	-40.78	-20	20.78
682.5000	56.13	Peak	H	200	199	-39.87	-20	19.87
...	...		H					
409.5000	54.99	Peak	V	122	90	-41.24	-20	21.24
546.0000	55.67	Peak	V	100	67	-40.67	-20	20.67
682.5000	50.78	Peak	V	100	188	-45.55	-20	25.55
...	...		V					

Modulation		FM		Channel Separation		12.5KHz		
Test Channel		Middle Channel		Test Frequency		155.5000 MHz		
Frequency (MHz)	E-Field Level (dBuV/m)	EMI Detector (Peak/QP)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	ERP measured by Substitution Method (dBm)	Limit (dBm)	Margin (dB)
466.5000	54.49	Peak	H	309	120	-42.23	-20	22.23
622.0000	55.34	Peak	H	300	331	-40.99	-20	20.99
777.5000	51.54	Peak	H	233	256	-45.22	-20	25.22
...	...		H					
466.5000	49.57	Peak	V	100	198	-40.55	-20	20.55
622.0000	56.12	Peak	V	100	233	-40.06	-20	20.06
777.5000	52.01	Peak	V	108	321	-44.44	-20	24.44
...	...		V					

Modulation		FM		Channel Separation		12.5KHz		
Test Channel		High Channel		Test Frequency		173.5000 MHz		
Frequency (MHz)	E-Field Level (dBuV/m)	EMI Detector (Peak/QP)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	ERP measured by Substitution Method (dBm)	Limit (dBm)	Margin (dB)
347.0000	52.91	Peak	H	100	344	-43.66	-20	23.66
520.5000	55.12	Peak	H	155	200	-41.11	-20	21.11
694.0000	57.38	Peak	H	400	109	-39.06	-20	19.06
...	...		H					
347.0000	50.96	Peak	V	150	294	-45.45	-20	25.45
520.5000	56.48	Peak	V	129	355	-40.06	-20	20.06
694.0000	55.36	Peak	V	108	10	-41.00	-20	21.00
...	...		V					

Modulation		4FSK		Channel Separation		12.5KHz		
Test Channel		Low Channel		Test Frequency		136.5000 MHz		
Frequency (MHz)	E-Field Level (dBuv/m)	EMI Detector (Peak/QP)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	ERP measured by Substitution Method (dBm)	Limit (dBm)	Margin (dB)
409.5000	55.11	Peak	H	254	304	-41.22	-20	21.22
546.0000	57.44	Peak	H	100	201	-39.11	-20	19.11
682.5000	55.71	Peak	H	153	344	-40.67	-20	20.67
...	...		H					
409.5000	53.93	Peak	V	124	100	-42.55	-20	22.55
546.0000	51.11	Peak	V	124	67	-45.12	-20	25.12
682.5000	56.24	Peak	V	100	198	-40.22	-20	20.22
...	...		V					

Modulation		4FSK		Channel Separation		12.5KHz		
Test Channel		Middle Channel		Test Frequency		155.5000 MHz		
Frequency (MHz)	E-Field Level (dBuv/m)	EMI Detector (Peak/QP)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	ERP measured by Substitution Method (dBm)	Limit (dBm)	Margin (dB)
466.5000	54.23	Peak	H	200	333	-42.11	-20	22.11
622.0000	53.05	Peak	H	312	289	-43.00	-20	23.00
777.5000	51.12	Peak	H	350	102	-45.78	-20	25.78
...	...		H					
466.5000	55.40	Peak	V	100	359	-41.34	-20	21.34
622.0000	56.53	Peak	V	106	231	-40.08	-20	20.08
777.5000	56.88	Peak	V	108	100	-39.56	-20	19.56
...	...		V					

Modulation		4FSK		Channel Separation		12.5KHz		
Test Channel		High Channel		Test Frequency		173.5000 MHz		
Frequency (MHz)	E-Field Level (dBuv/m)	EMI Detector (Peak/QP)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	ERP measured by Substitution Method (dBm)	Limit (dBm)	Margin (dB)
347.0000	56.32	Peak	H	150	277	-40.33	-20	20.33
520.5000	55.84	Peak	H	100	322	-40.09	-20	20.09
694.0000	57.05	Peak	H	294	198	-39.11	-20	19.11
...	...		H					
347.0000	54.66	Peak	V	128	360	-41.77	-20	21.77
520.5000	54.61	Peak	V	128	78	-41.56	-20	21.56
694.0000	56.43	Peak	V	100	182	-39.63	-20	19.63
...	...		V					

4.4. Spurious Emssion on Antenna Port

TEST APPLICABLE

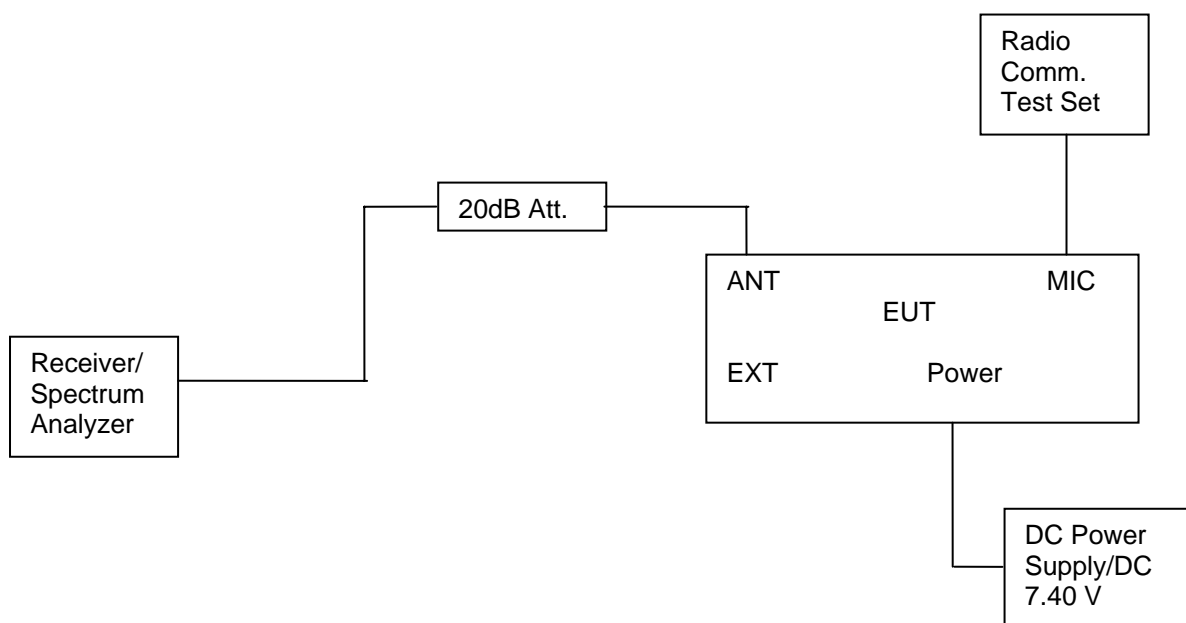
The same as Section 4.3

TEST PROCEDURE

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set to 100 kHz. Sufficient scans were taken to show any out of band emission up to 10th. Harmonic for the lower and the highest frequency range. Set RBW 100 kHz, VBW 300 kHz in the frequency band 30MHz to 1GHz,while set RBW=1MHz.VBW=3MHz from the 1GHz to 10th Harmonic.

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

TEST CONFIGURATION



TEST RESULTS

Modulation Type: FM

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue 11 (12.5 kHz bandwidth only): On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f d in kHz) of more than 12.5 kHz at least:

Low: $50 + 10 \log (P_{watts}) = 50 + 10 \log (5.01) = 56.99 \text{ dB}$

High: $50 + 10 \log (P_{watts}) = 50 + 10 \log (5.08) = 57.06 \text{ dB}$

Note: In general, the worse case attenuation requirement shown above was applied.

Calculation: Limit (dBm) = $EL - 50 - 10 \log_{10} (TP)$

Notes: EL is the emission level of the Output Power expressed in dBm, In this application, the EL is 36.99 dBm.

Limit (dBm) = $36.99 - 50 - 10 \log_{10} (5.08) = -20 \text{ dBm}$

Modulation Type: 4FSK

FCC Part 22.359, 74.462, 80.211 and 90.210 and RSS Gen, RSS 119 Issue 11 (12.5 kHz Bandwidth only):
 On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f d in kHz) of more than 12.5 kHz at least:

Low: $50 + 10 \log(P_{\text{watts}}) = 50 + 10 \log(5.03) = 57.02 \text{ dB}$

High: $50 + 10 \log(P_{\text{watts}}) = 50 + 10 \log(5.09) = 57.07 \text{ dB}$

Note: In general, the worse case attenuation requirement shown above was applied.

Calculation: Limit (dBm) = EL-50-10log10 (TP)

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

In this application, the EL is 36.99 dBm.

Limit (dBm) = 36.99-50-10log10 (5.75) = -20 dBm

Note: 1. In general, the worse case attenuation requirement shown above was applied.

2. The measurement frequency range from 30MHz to 2 GHz.

For Rated High Power (5Watt)

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz	
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)
FM	12.5KHz	Low	136.5000	272.99	-23.87	1691.38	-39.75
		Middle	155.5000	309.92	-22.03	1637.27	-38.90
		High	173.5000	346.85	-21.93	1667.33	-38.81
4FSK	12.5KHz	Low	136.5000	272.99	-23.54	1462.93	-38.39
		Middle	155.5000	309.92	-22.02	1384.77	-39.70
		High	173.5000	346.85	-21.32	1609.22	-38.97
Limit		-20dBm for 12.5KHz Channel Separation					
Test Results		Compliance					

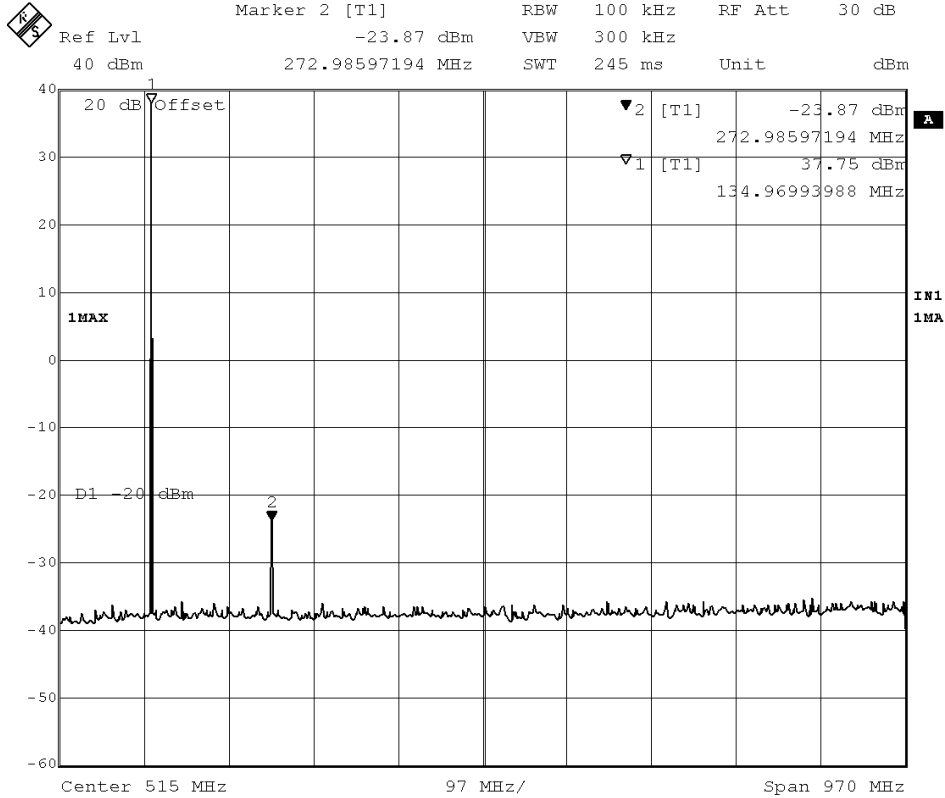
For Rated Low Power (1Watt)

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz	
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)
FM	12.5KHz	Low	136.5000	272.99	-33.74	1621.64	-39.68
		Middle	155.5000	309.92	-34.09	1609.22	-38.98
		High	173.5000	346.85	-32.55	1683.37	-38.66
4FSK	12.5KHz	Low	136.5000	272.99	-33.63	1647.29	-39.63
		Middle	155.5000	309.92	-32.94	1521.04	-38.83
		High	173.5000	346.85	-33.83	1951.90	-39.23
Limit		-20dBm for 12.5KHz Channel Separation					
Test Results		Compliance					

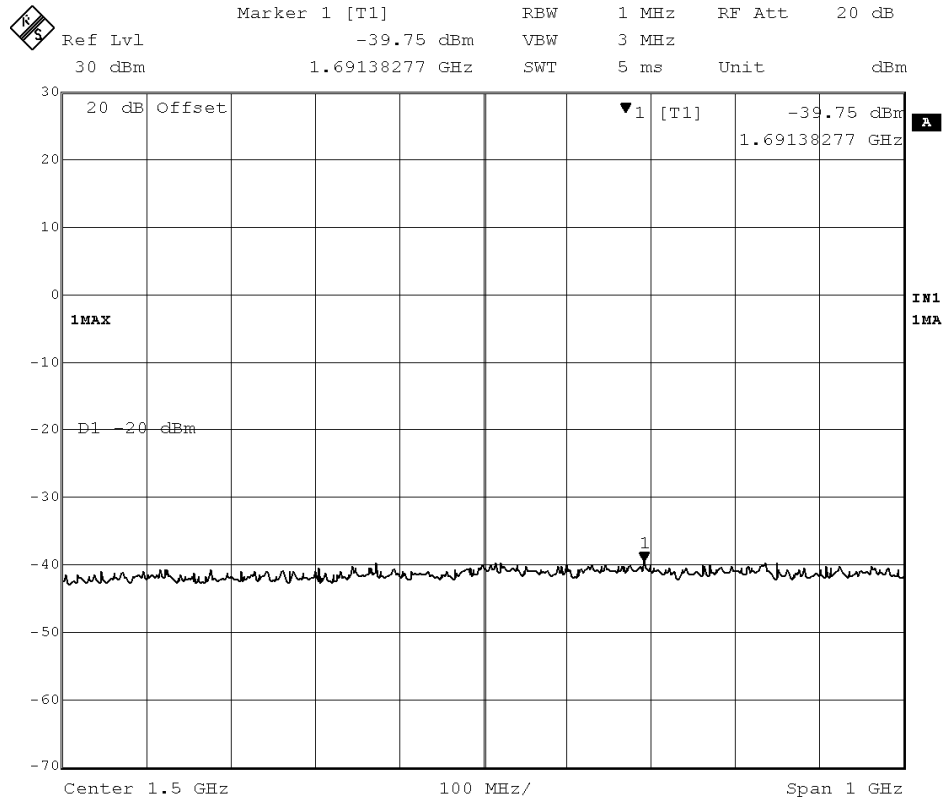
Plots of Spurious Emission on Antenna Port Measurement

For Rated High Power (5Watt)

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	Low	136.5000	272.99	-23.87	1691.38	-39.75	-20dBm
Test Results				Compliance				

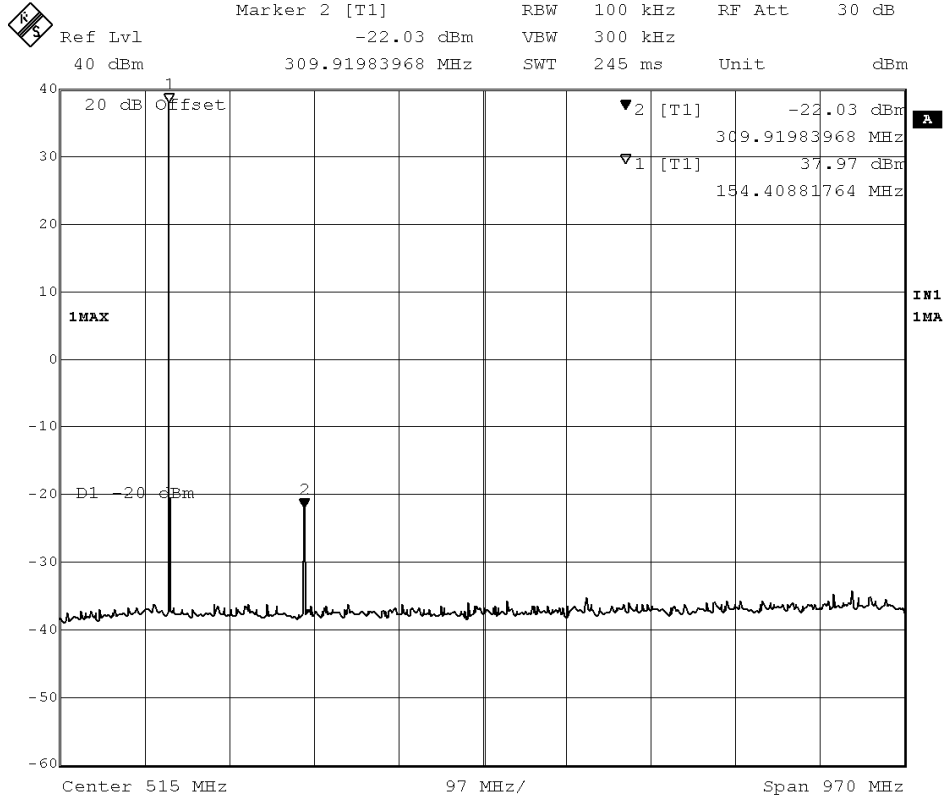


Date: 26.DEC.2011 22:37:05

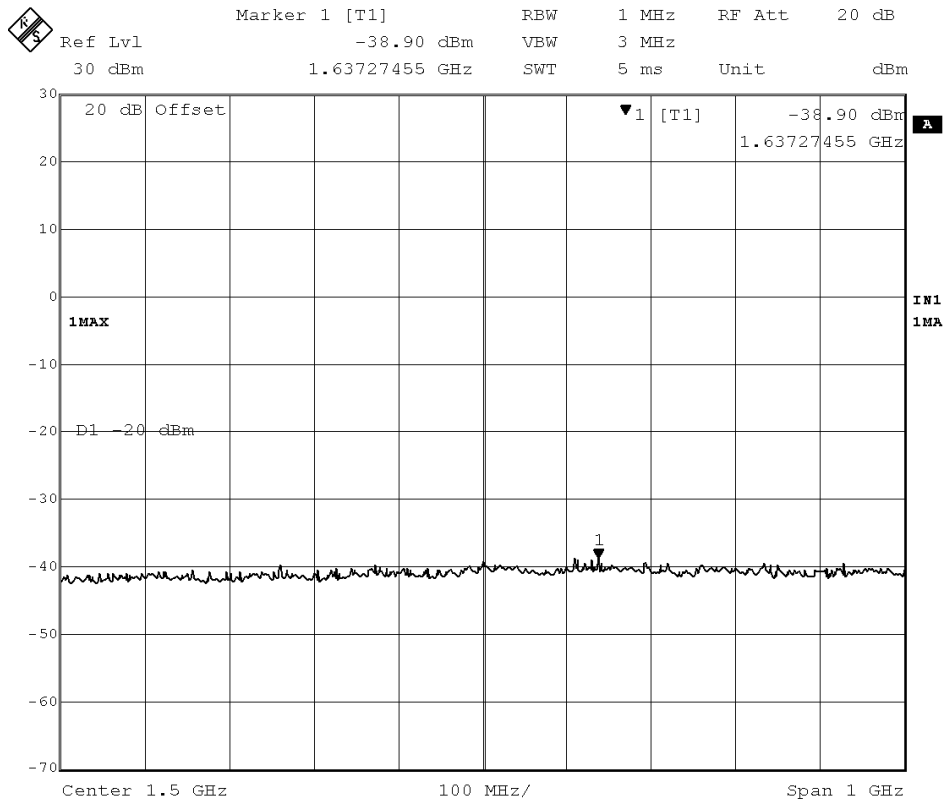


Date: 26.DEC.2011 22:45:35

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	Middle	155.5000	309.92	-22.03	1637.27	-38.90	-20dBm
Test Results				Compliance				

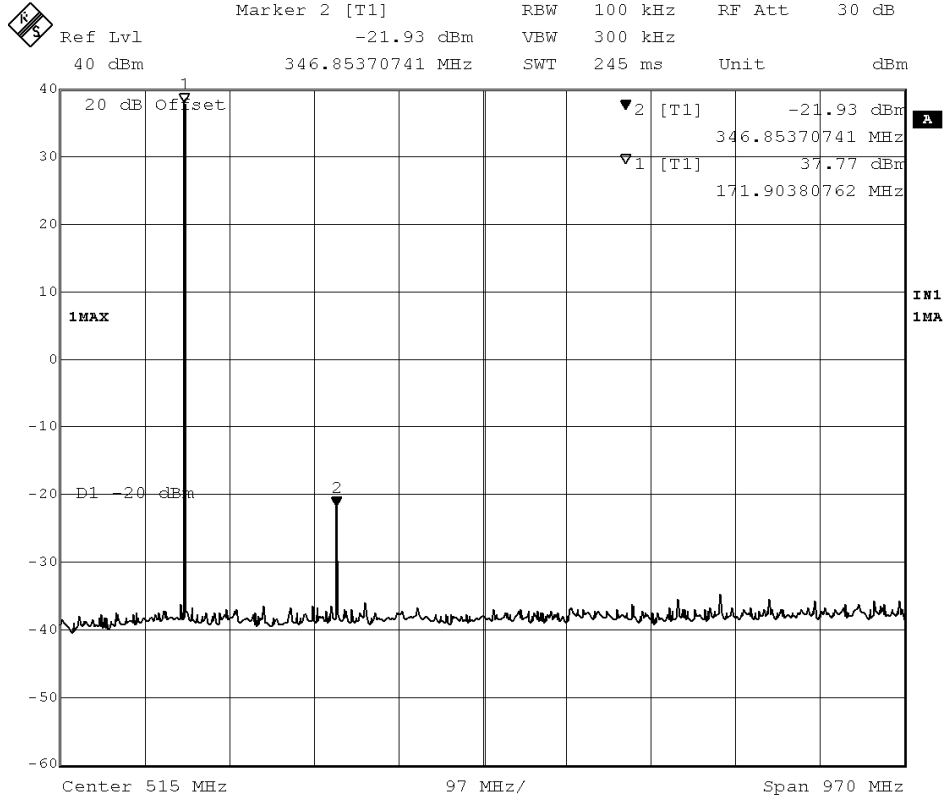


Date: 26.DEC.2011 22:38:02

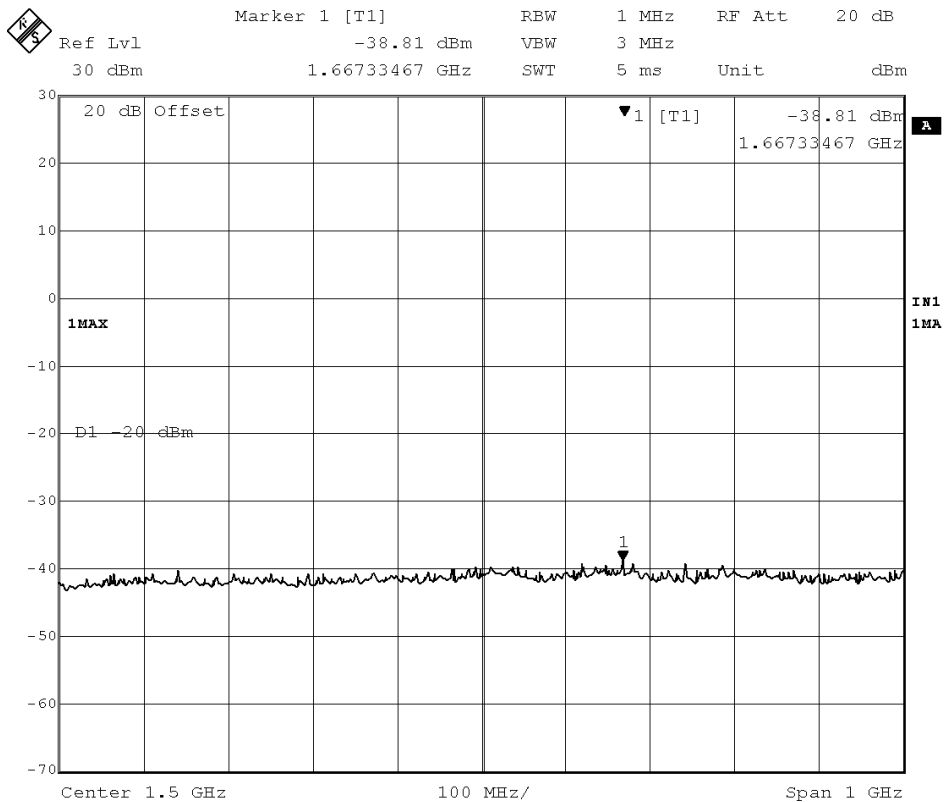


Date: 26.DEC.2011 22:46:24

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	High	173.5000	346.85	-21.93	1667.33	-38.81	-20dBm
Test Results				Compliance				

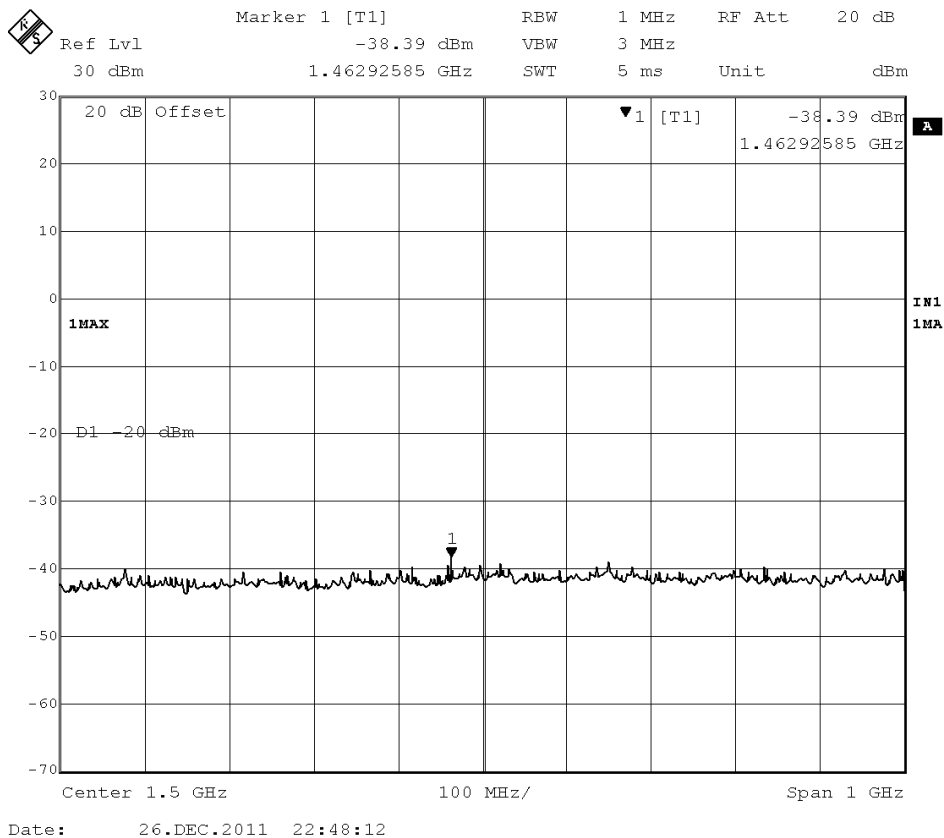
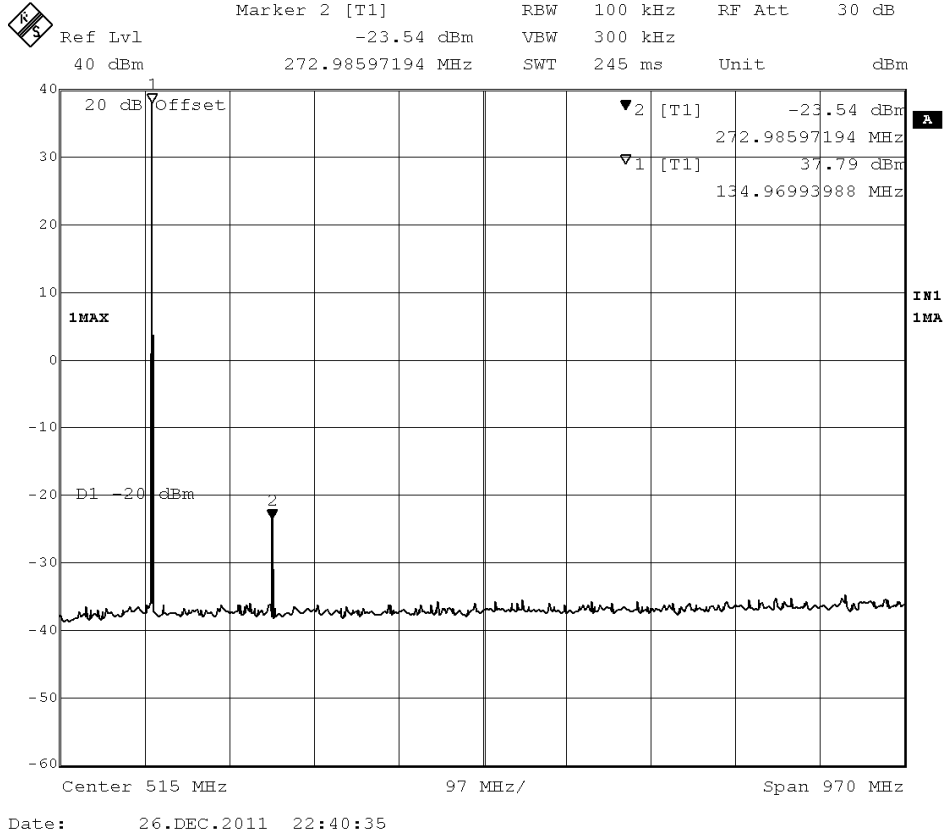


Date: 26.DEC.2011 22:39:27

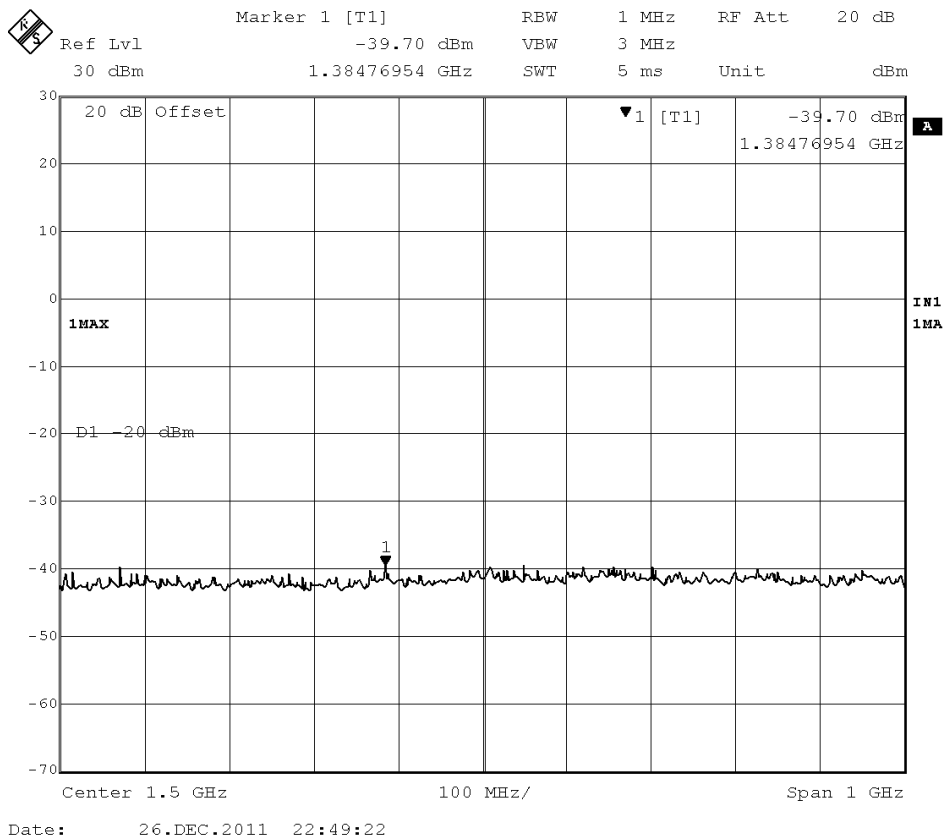
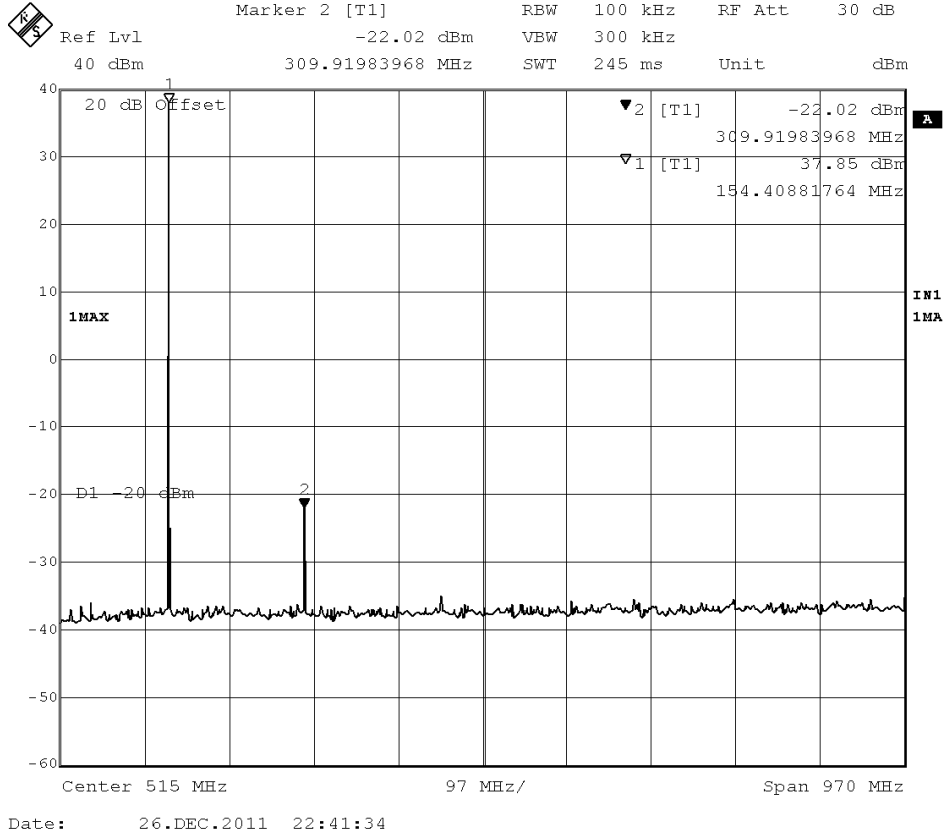


Date: 26.DEC.2011 22:47:13

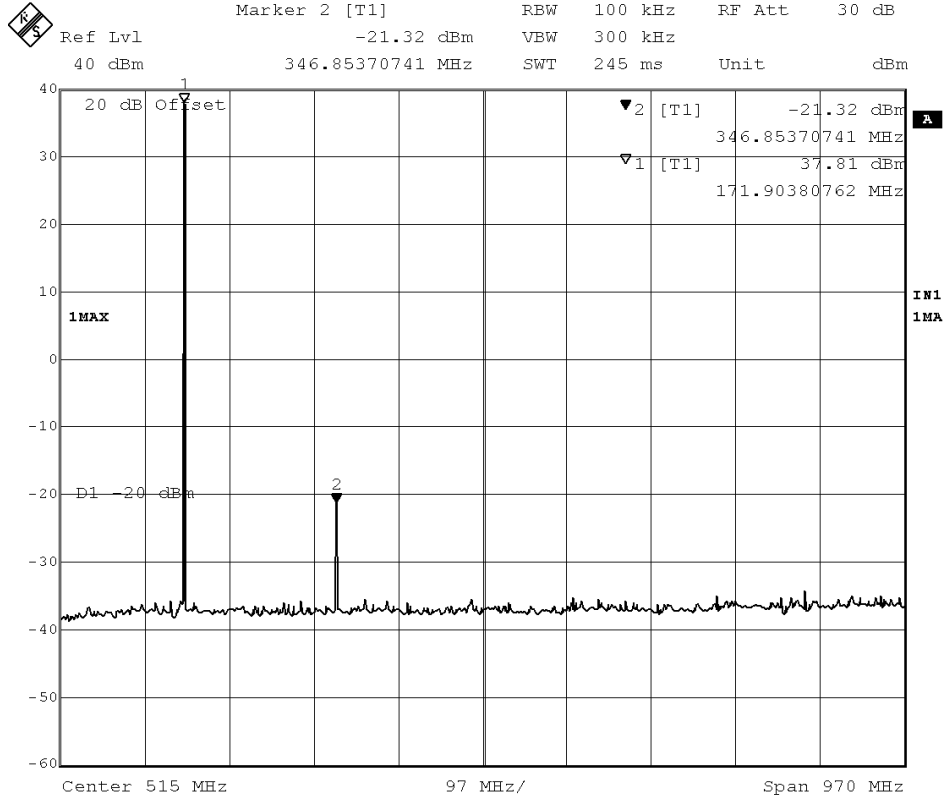
Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
4FSK	12.5KHz	Low	136.5000	272.99	-23.54	1462.93	-38.39	-20dBm
Test Results				Compliance				



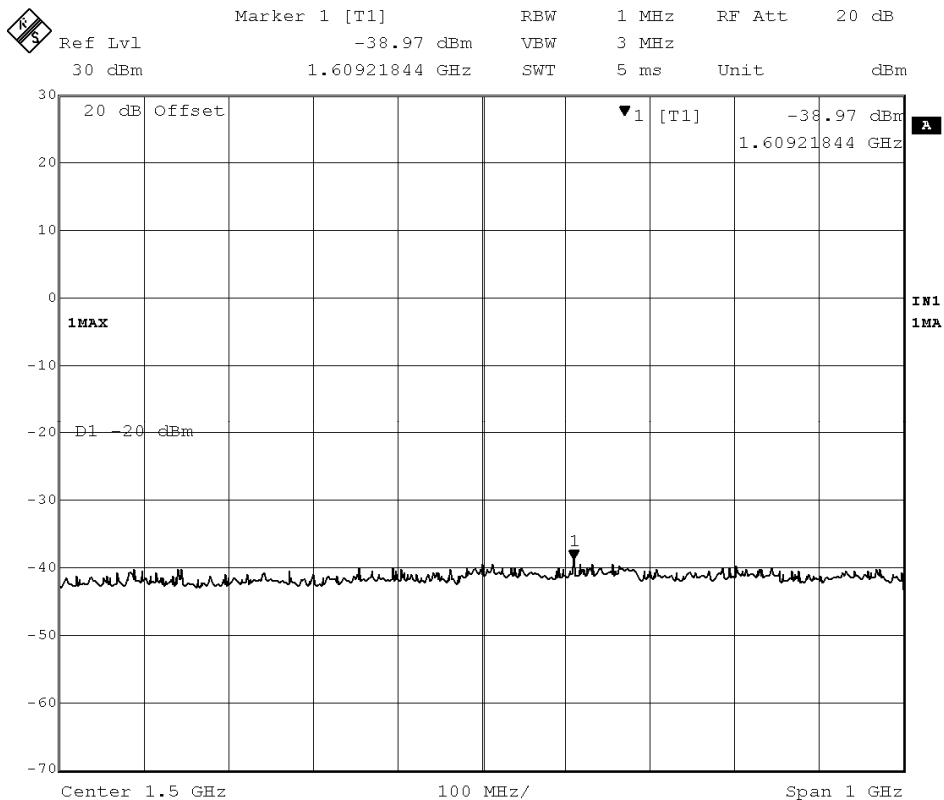
Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
4FSK	12.5KHz	Middle	155.5000	309.92	-22.02	1384.77	-39.70	-20dBm
Test Results				Compliance				



Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
4FSK	12.5KHz	High	173.5000	346.85	-21.32	1609.22	-38.97	-20dBm
Test Results				Compliance				



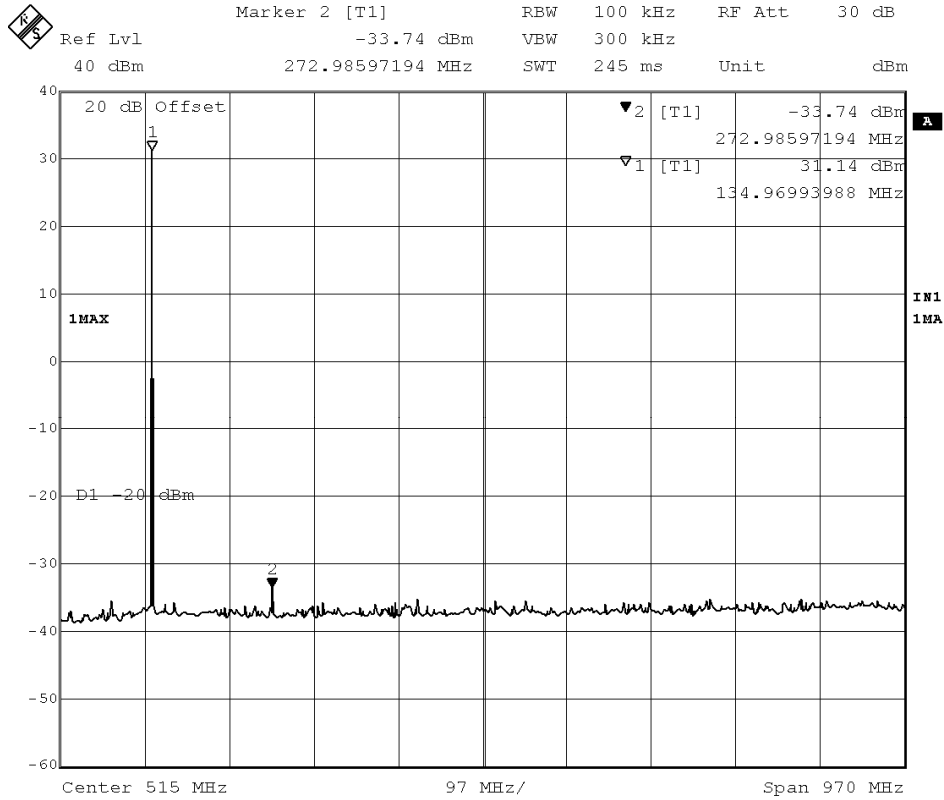
Date: 26.DEC.2011 22:43:35



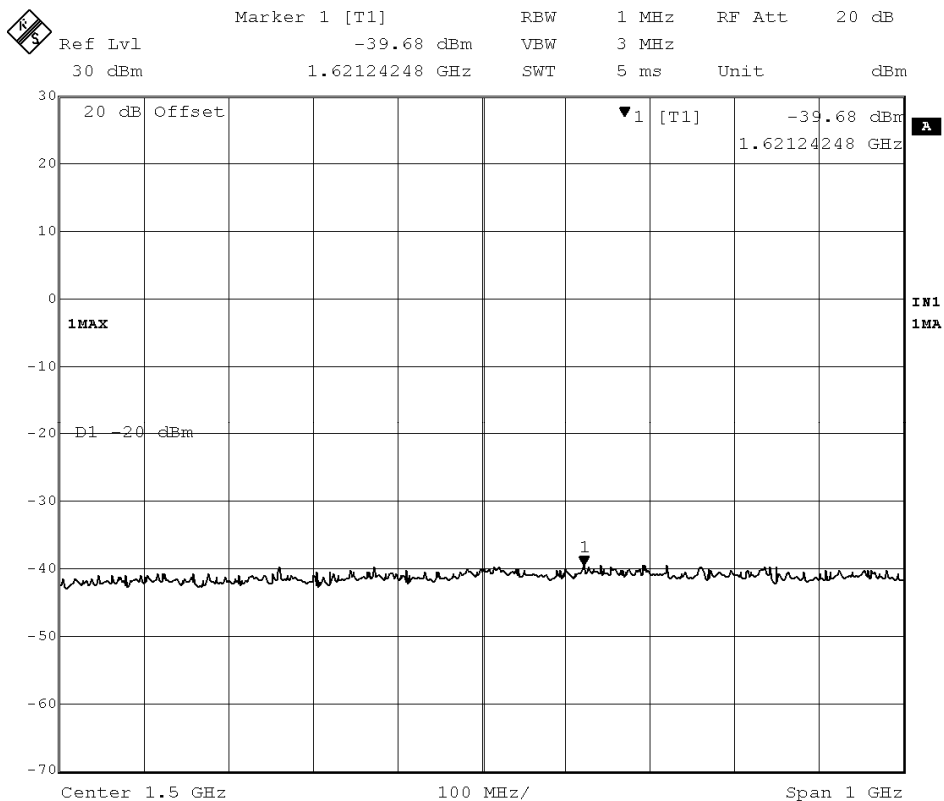
Date: 26.DEC.2011 22:51:13

For Rated Low Power (1Watt)

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	Low	136.5000	272.99	-33.74	1621.64	-39.68	-20dBm
Test Results				Compliance				

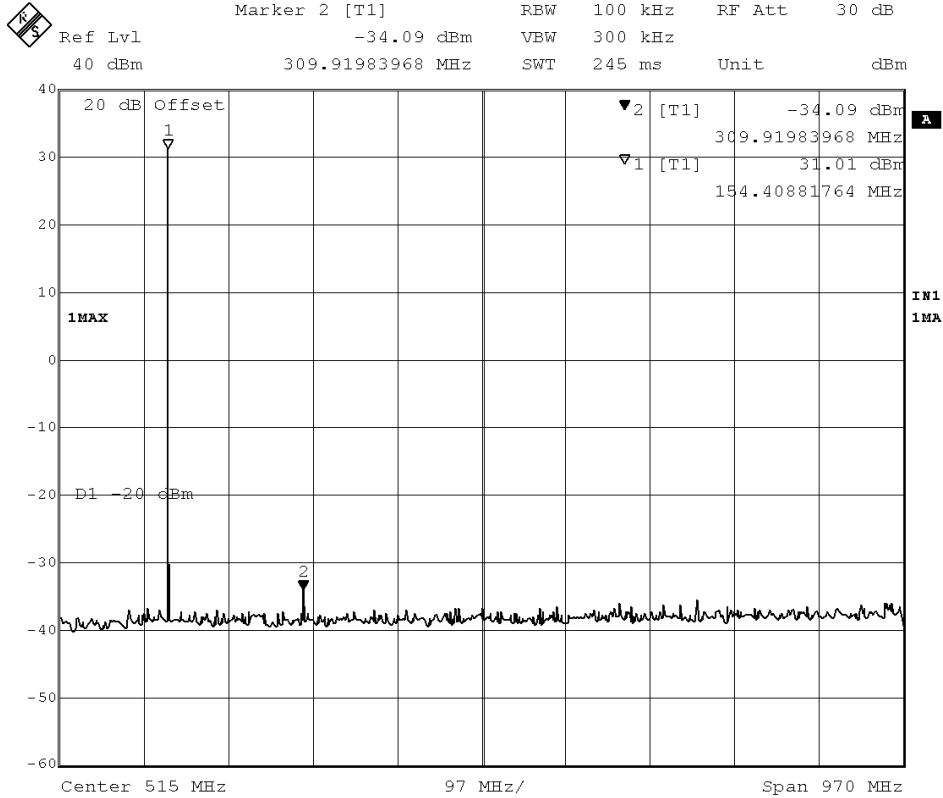


Date: 26.DEC.2011 22:36:22

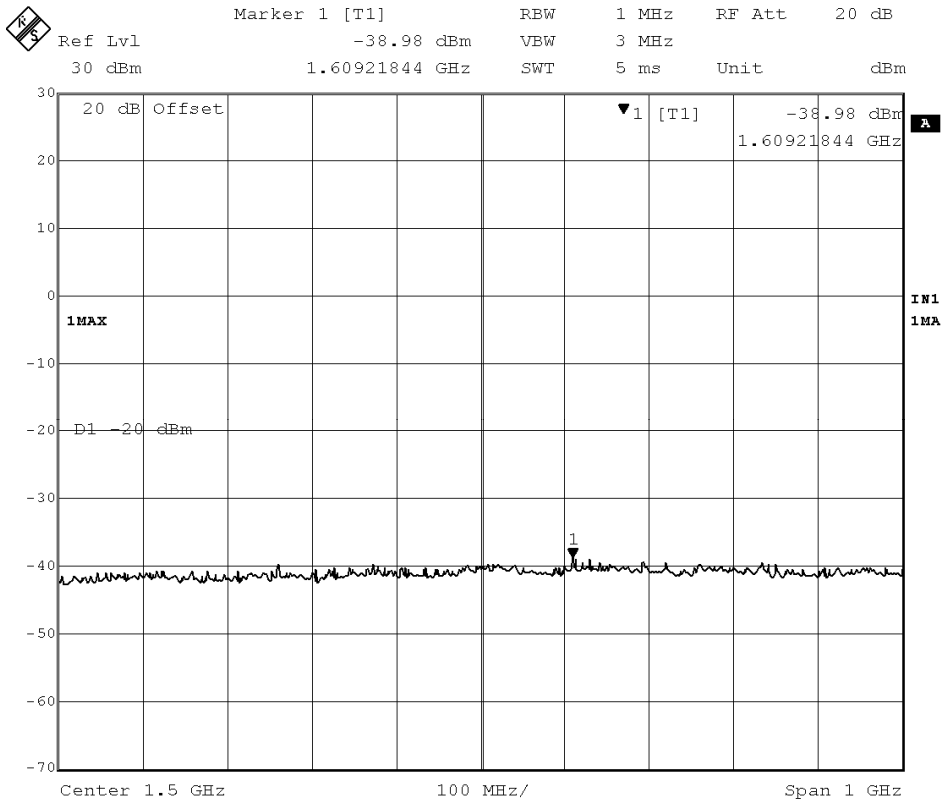


Date: 26.DEC.2011 22:45:49

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	Middle	155.5000	309.92	-34.09	1609.22	-38.98	-20dBm
Test Results				Compliance				

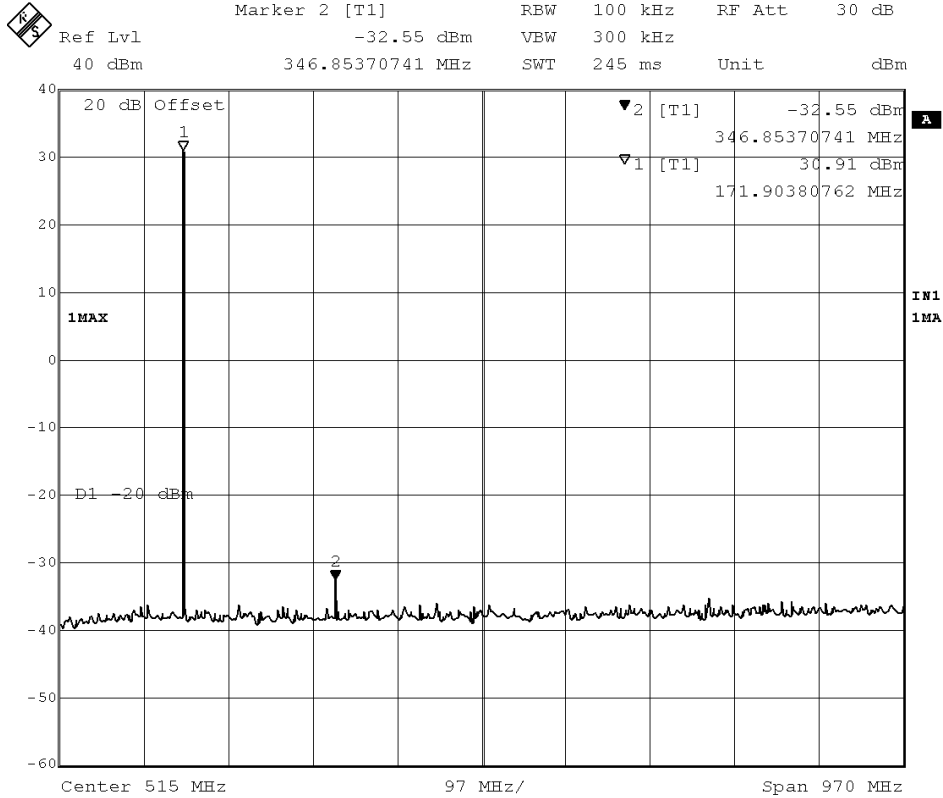


Date: 26.DEC.2011 22:38:25

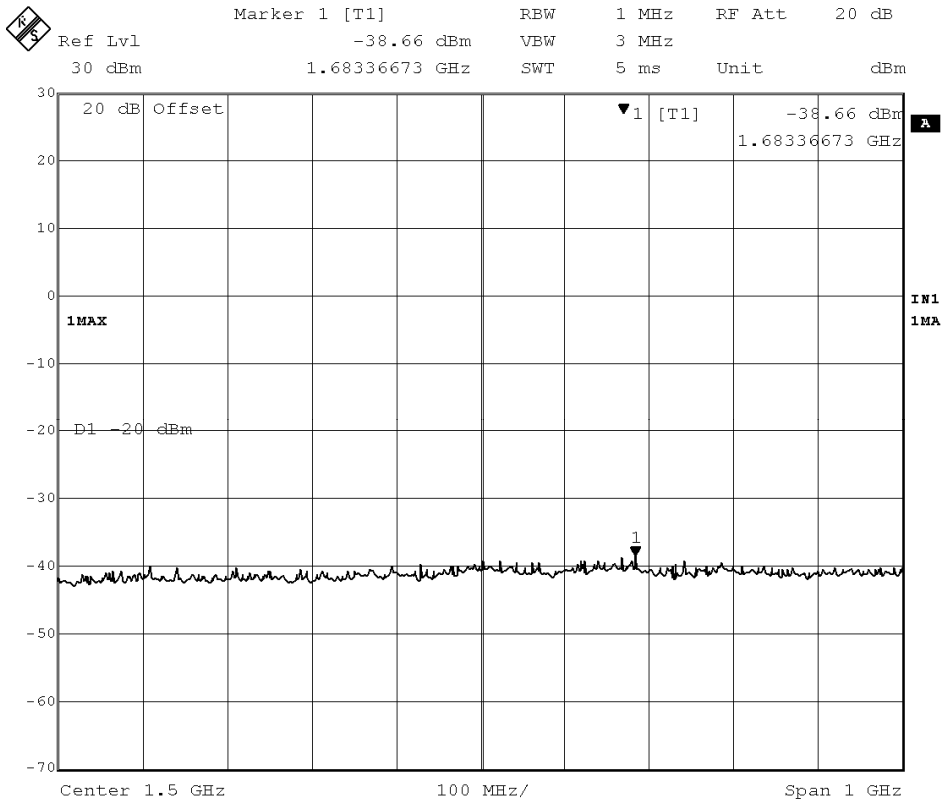


Date: 26.DEC.2011 22:46:09

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
FM	12.5KHz	High	173.5000	346.85	-32.55	1683.37	-38.66	-20dBm
Test Results				Compliance				

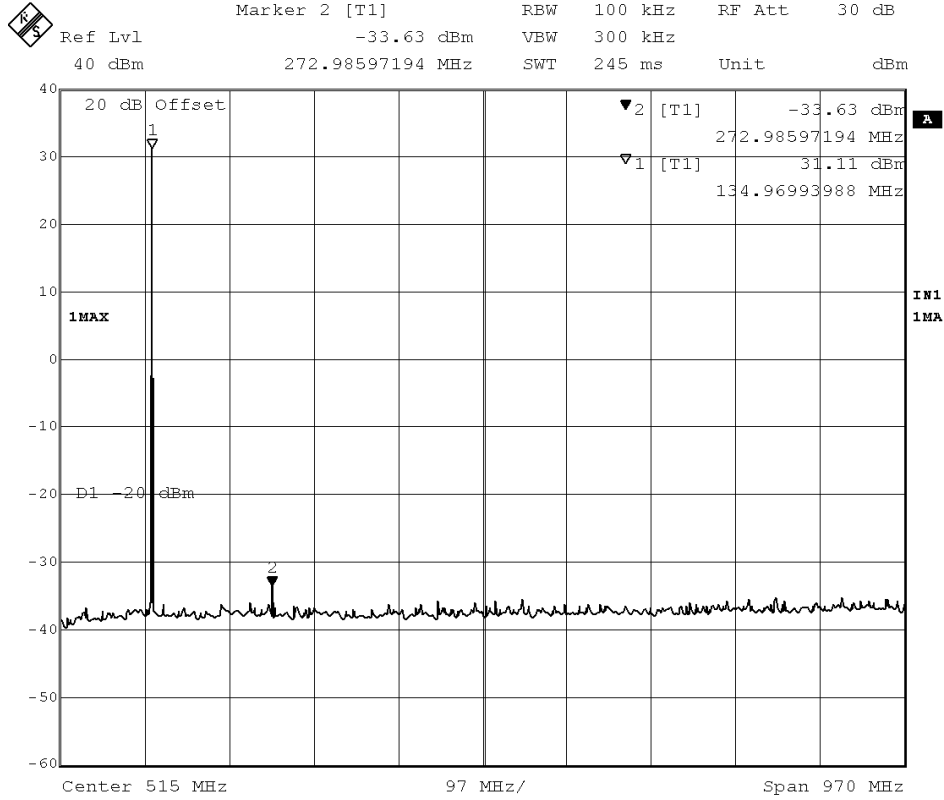


Date: 26.DEC.2011 22:39:11

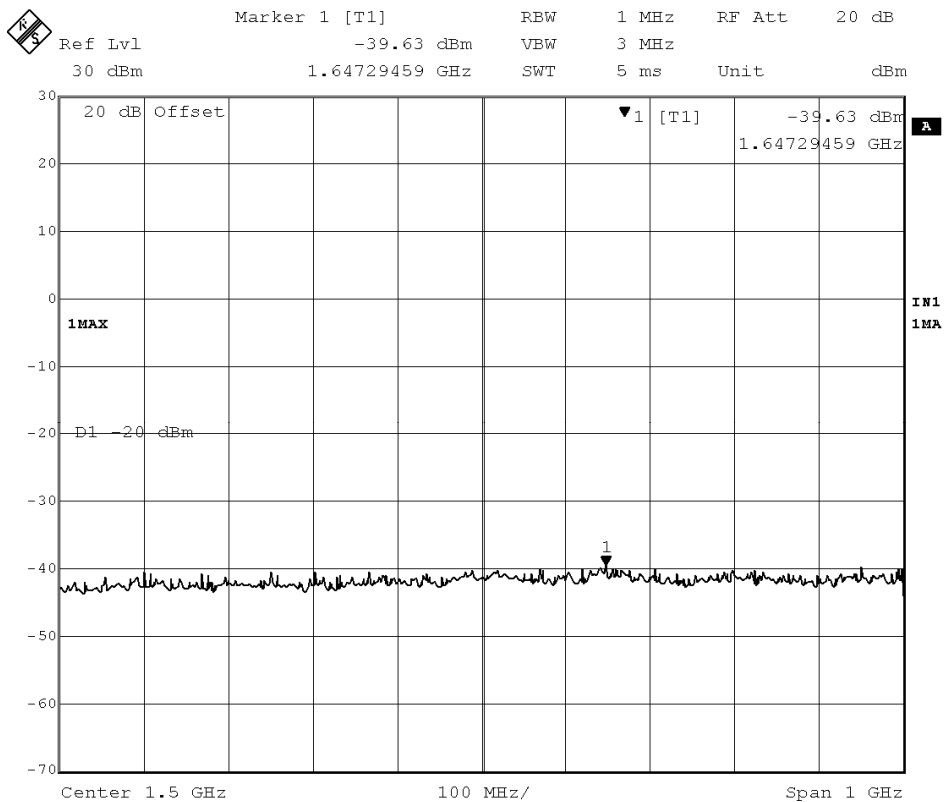


Date: 26.DEC.2011 22:47:36

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
4FSK	12.5KHz	Low	136.5000	272.99	-33.63	1647.29	-39.63	-20dBm
Test Results				Compliance				

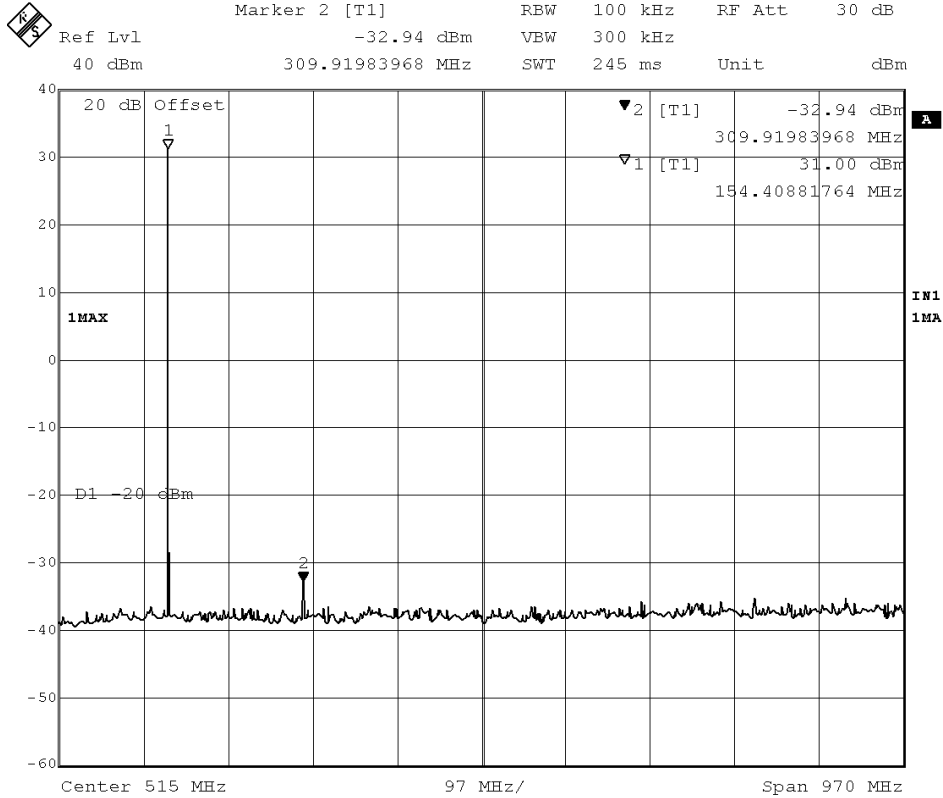


Date: 26.DEC.2011 22:40:06

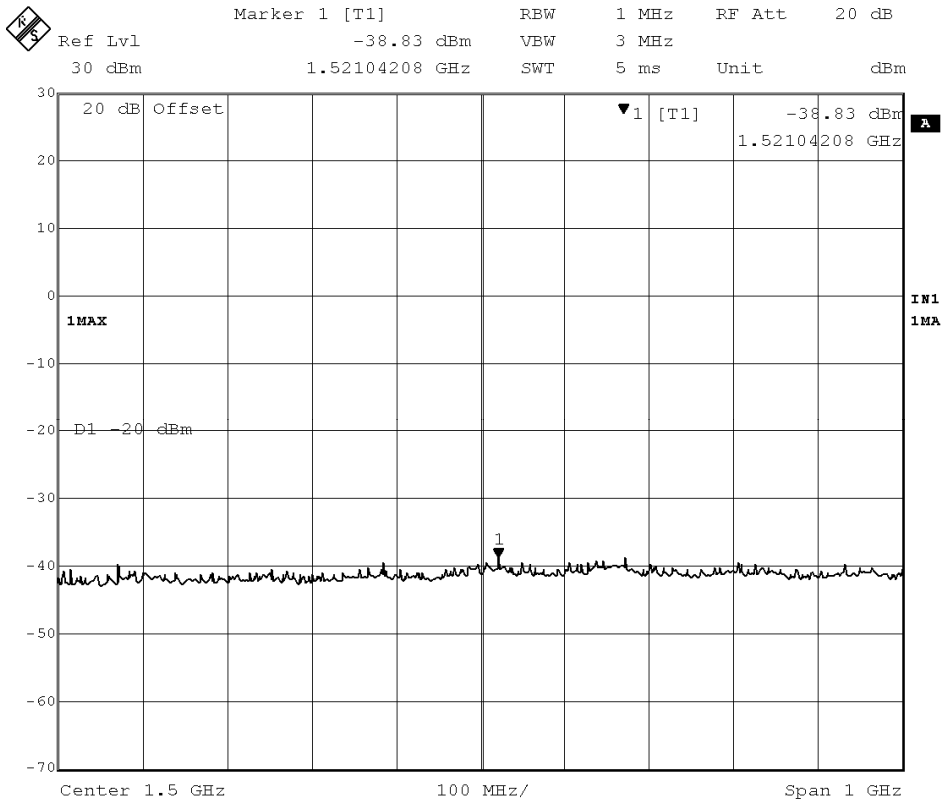


Date: 26.DEC.2011 22:48:42

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
4FSK	12.5KHz	Middle	155.5000	309.92	-32.94	1521.04	-38.83	-20dBm
Test Results				Compliance				

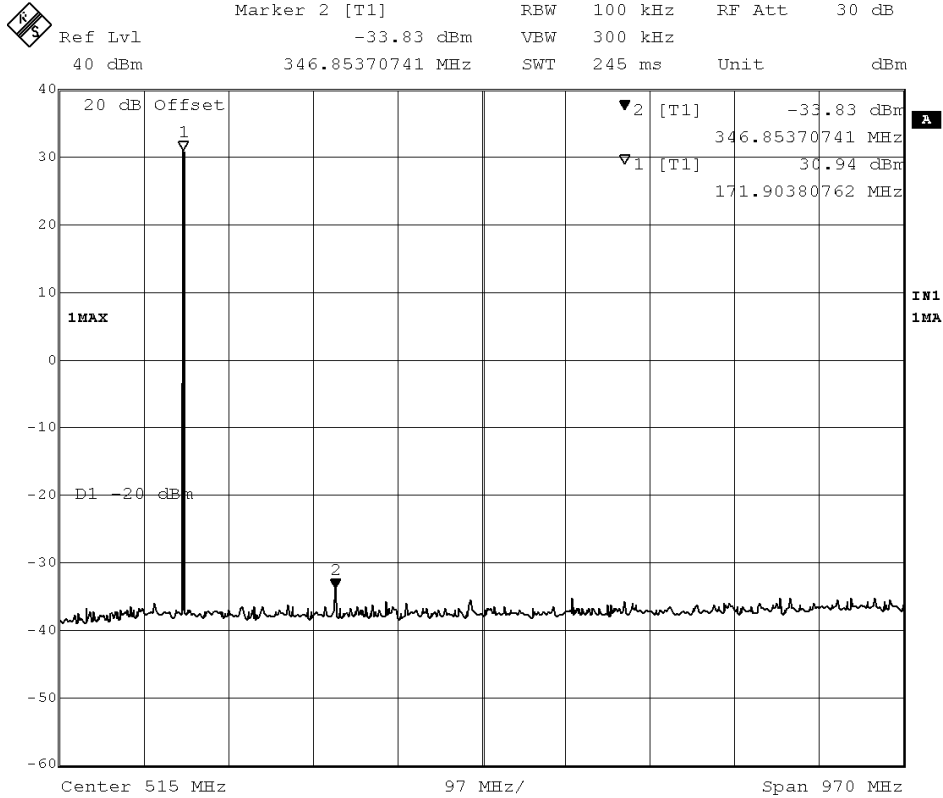


Date: 26.DEC.2011 22:42:01

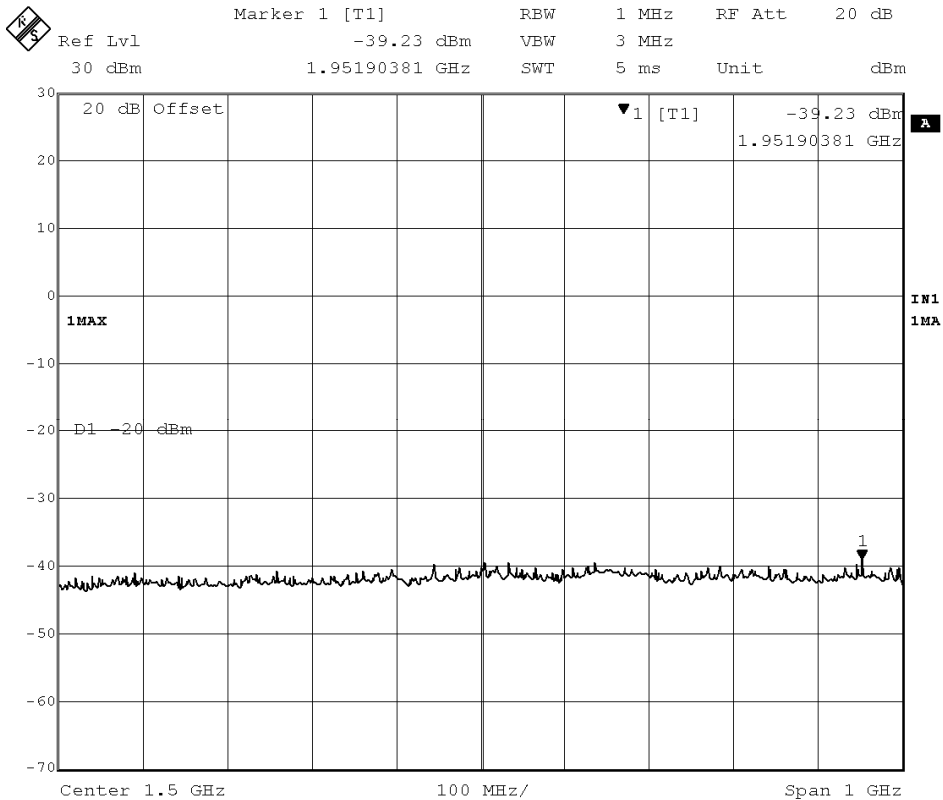


Date: 26.DEC.2011 22:49:41

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	Maximum Conducted Spurious Emissions Below 1GHz		Maximum Conducted Spurious Emissions Above 1GHz		FCC Limit
				Frequency (MHz)	Datum (dBm)	Frequency (MHz)	Datum (dBm)	
4FSK	12.5KHz	High	173.5000	346.85	-33.83	1951.90	-39.23	-20dBm
Test Results				Compliance				



Date: 26.DEC.2011 22:43:02



Date: 26.DEC.2011 22:50:15

4.5. Modulation Characteristics

TEST APPLICABLE

According to CFR47 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.

TEST PROCEDURE

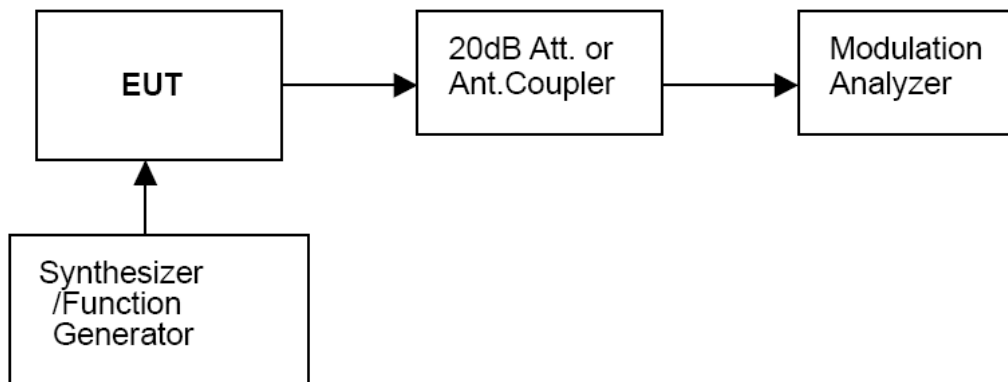
Modulation Limit

- 1 Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1 KHz 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, 1004, 1500 and 2500Hz in sequence.

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 (0dB).
- 3 Vary the Audio frequency from 100 Hz to 3 KHz and record the frequency deviation.
- 4 Audio Frequency Response = $20 \log_{10} (\text{Deviation of test frequency} / \text{Deviation of 1 KHz reference})$.

TEST CONFIGURATION

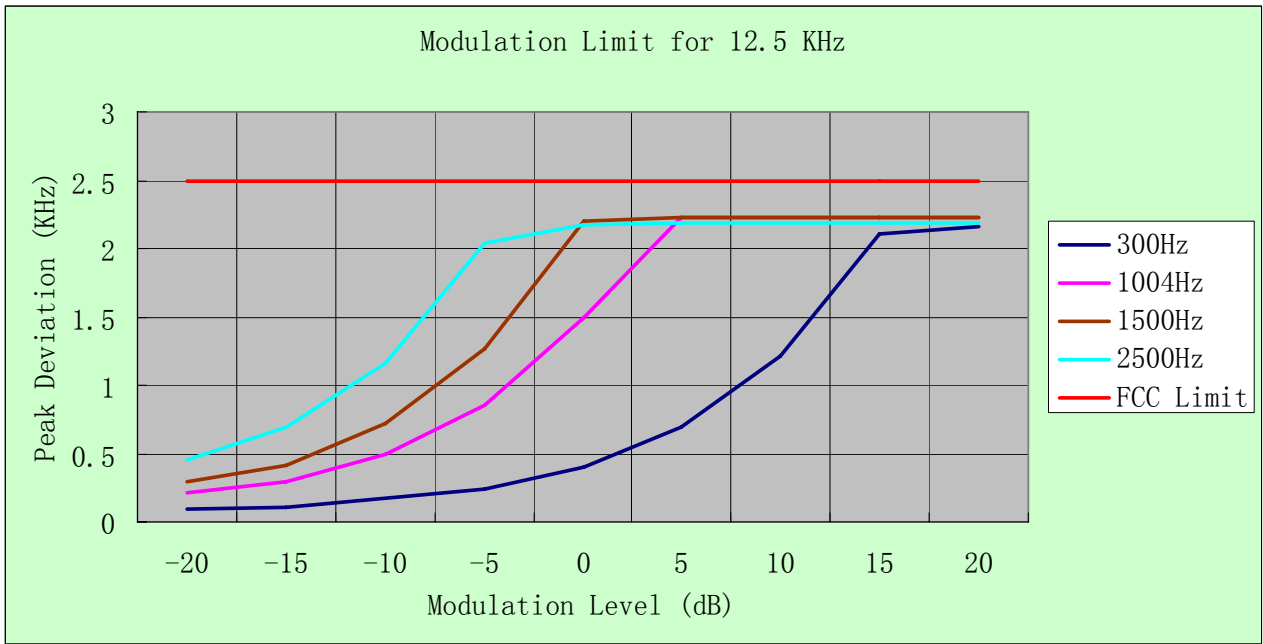


TEST RESULTS

Modulation Type: FM

12.5 KHz Channel Separation

Modulation Level(dB)	Peak Freq. Deviation At 300 Hz(KHz)	Peak Freq. Deviation At 1004 H(KHz)	Peak Freq. Deviation At 1500 Hz(KHz)	Peak Freq. Deviation At 2500 Hz(KHz)
-20	0.09	0.21	0.29	0.45
-15	0.11	0.29	0.41	0.69
-10	0.17	0.50	0.72	1.16
-5	0.24	0.86	1.27	2.04
0	0.40	1.50	2.20	2.18
+5	0.69	2.23	2.23	2.19
+10	1.21	2.23	2.23	2.19
+15	2.11	2.23	2.23	2.19
+20	2.16	2.23	2.23	2.19



Modulation type: 4FSK

Channel bandwidth: 12.5 kHz

It is not applicable for devices which operate with the digitized voice/data modulation type.

b). Audio Frequency Response:

Rule Part No.: Part 2.1407(a) (b)

Method of Measurement:

The audio frequency response was measured in accordance with TIA/EIA Specification 603 with no exception. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 300-3000Hz shall be submitted and Audio Post Limiter Low Pass Filter Response from 3.0 KHz to 50KHz. However, the audio frequency response should test from 100Hz to 5.0 KHz according to FCC Part 90.

Modulation Type: FM

The audio frequency response curve is show below.and

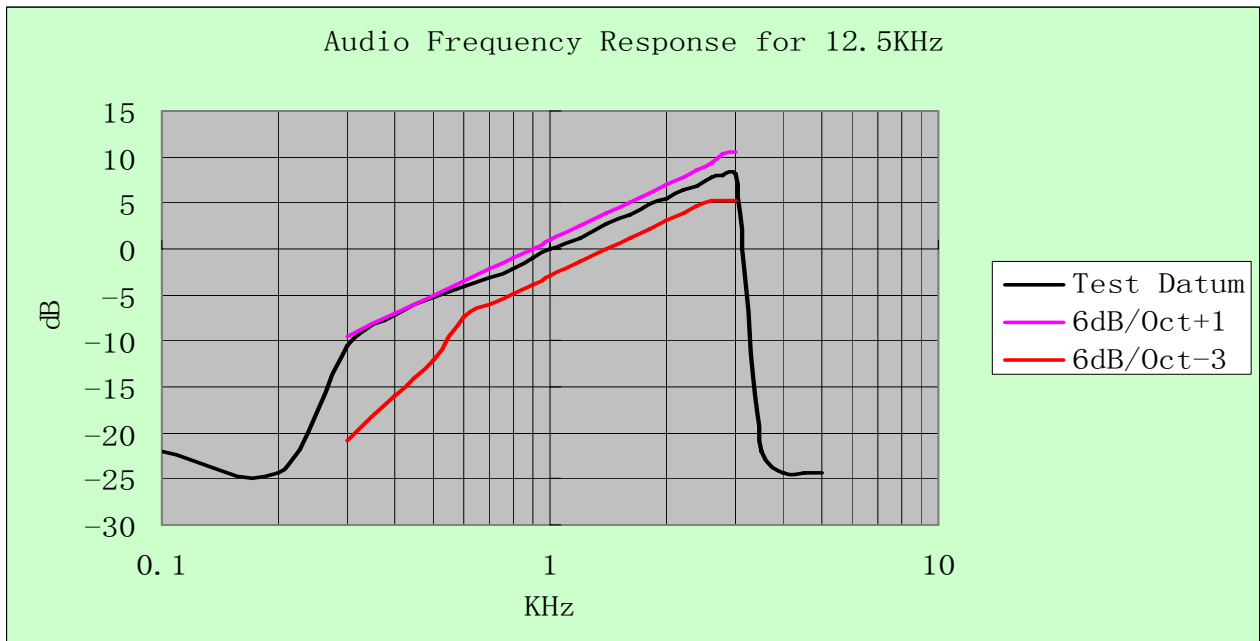
Test Audio Level (1 KHz and 20% maximum deviation) for 12.5 KHz channel separation is 2.80mv

Note:

- 1 Not applicable to new standard. However, tests are conducted under FCC's recommendation.
- 2 The Audio Frequency Response is identical for 12.5 KHz channel separation

For 12.5 KHz

Frequency (KHz)	Frequency Deviation (KHz)	1KHz Reference Deviation (KHz)	Audio Frequency Response (dB)
0.1	0.04	0.50	-21.94
0.2	0.03	0.50	-24.44
0.3	0.15	0.50	-10.46
0.4	0.22	0.50	-7.13
0.5	0.27	0.50	-5.35
0.6	0.31	0.50	-4.15
0.7	0.35	0.50	-3.10
0.8	0.39	0.50	-2.16
0.9	0.45	0.50	-0.92
1.0	0.50	0.50	0.00
1.2	0.57	0.50	1.14
1.4	0.69	0.50	2.80
1.6	0.76	0.50	3.64
1.8	0.87	0.50	4.82
2.0	0.93	0.50	5.39
2.2	1.05	0.50	6.44
2.4	1.10	0.50	6.85
2.6	1.23	0.50	7.82
2.7	1.24	0.50	7.89
2.8	1.26	0.50	8.03
3.0	1.29	0.50	8.23
3.5	0.04	0.50	-21.94
4.0	0.03	0.50	-24.44
4.5	0.03	0.50	-24.44
5.0	0.03	0.50	-24.44



Modulation type: 4FSK

Channel bandwidth: 12.5 kHz

It is not applicable for devices which operate with the digitized voice/data modulation type.

4.6. Frequency Stability Test

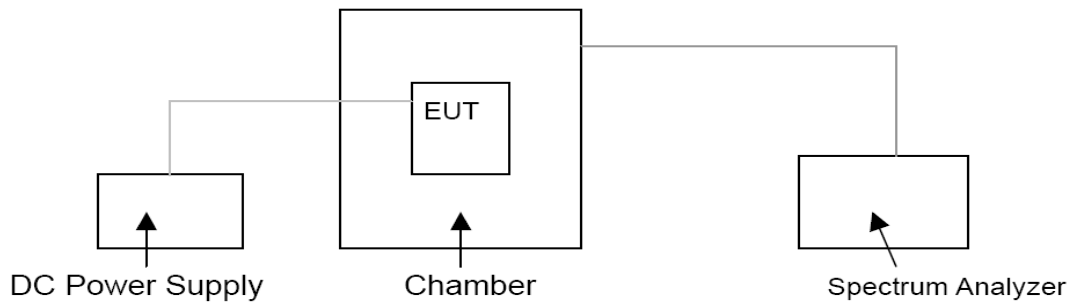
TEST APPLICABLE

- 1 According to FCC Part 2 Section 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30°C to +50°C 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 for other than hand carried battery equipment.
- 4 According to §90.213, the frequency stability limit is 5.0 ppm for 12.5KHz channel separation and 5 ppm for 25KHz channel separation.

TEST PROCEDURE

The EUT was set in the climate chamber and connected to an external DC power supply. The RF output was directly connected to Spectrum Analyzer ESI 26. The coupling loss of the additional cables was recorded and taken in account for all the measurements. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded. 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.

TEST CONFIGURATION



TEST LIMITS

According to 90.213, Transmitters used must have minimum frequency stability as specified in the following table.

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

TEST RESULTS

Modulation Type	Channel Separation	Test conditions		Frequency error (ppm)		
		Voltage(V)	Temp(°C)	Low Channel	Middle Channel	High Channel
Analog/FM	12.5KHz	7.40	-30	-1.45	-1.46	-1.47
			-20	-1.40	-1.45	-1.45
			-10	-1.39	-1.38	-1.41
			0	-1.24	-1.29	-1.25
			10	-1.00	-1.03	-0.99
			20	-0.94	-0.92	-0.82
			30	-0.88	-0.92	-0.69
			40	-1.05	-0.92	-0.69
			50	-1.22	-1.15	-0.95
		6.67 (End point)	20	-0.88	-0.79	-0.69
		6.29 (85% Rated)	20	-0.88	-0.76	-0.69
		8.51 (115% Rated)	20	-0.88	-0.79	-0.81
Limit			5.0 ppm			
Conclusion			Complies			

Modulation Type	Channel Separation	Test conditions		Frequency error (ppm)		
		Voltage(V)	Temp(°C)	Low Channel	Middle Channel	High Channel
Digital/4FSK	12.5KHz	7.40	-30	-1.46	-1.43	-1.42
			-20	-1.39	-1.36	-1.35
			-10	-1.34	-1.21	-1.26
			0	-1.23	-1.13	-1.20
			10	-1.02	-1.03	-1.01
			20	-0.94	-0.90	-0.82
			30	-0.88	-0.79	-0.81
			40	-1.00	-0.92	-0.96
			50	-1.25	-1.15	-0.96
		6.67 (End point)	20	-0.88	-0.79	-0.89
		6.29 (85% Rated)	20	-0.88	-0.79	-0.89
		8.51 (115% Rated)	20	-0.88	-0.79	-0.89
Limit			5.0 ppm			
Conclusion			Complies			

4.7. Maximum Transmitter Power

TEST APPLICABLE

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

TEST PROCEDURE

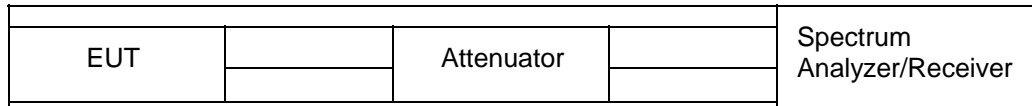
Measurements shall be made to establish the radio frequency power delivered by the transmitter the standard output termination. The power output shall be monitored and recorded and no adjustment shall be made to the transmitter after the test has begun, except as noted bellow:

If the power output is adjustable, measurements shall be made for the highest and lowest power levels.

The EUT connect to the Receiver through 20 dB attenuator.

Measurement with Spectrum Analyzer ESI 26 conducted, external power supply with 7.40 V stabilized supply voltage.

TEST CONFIGURATION



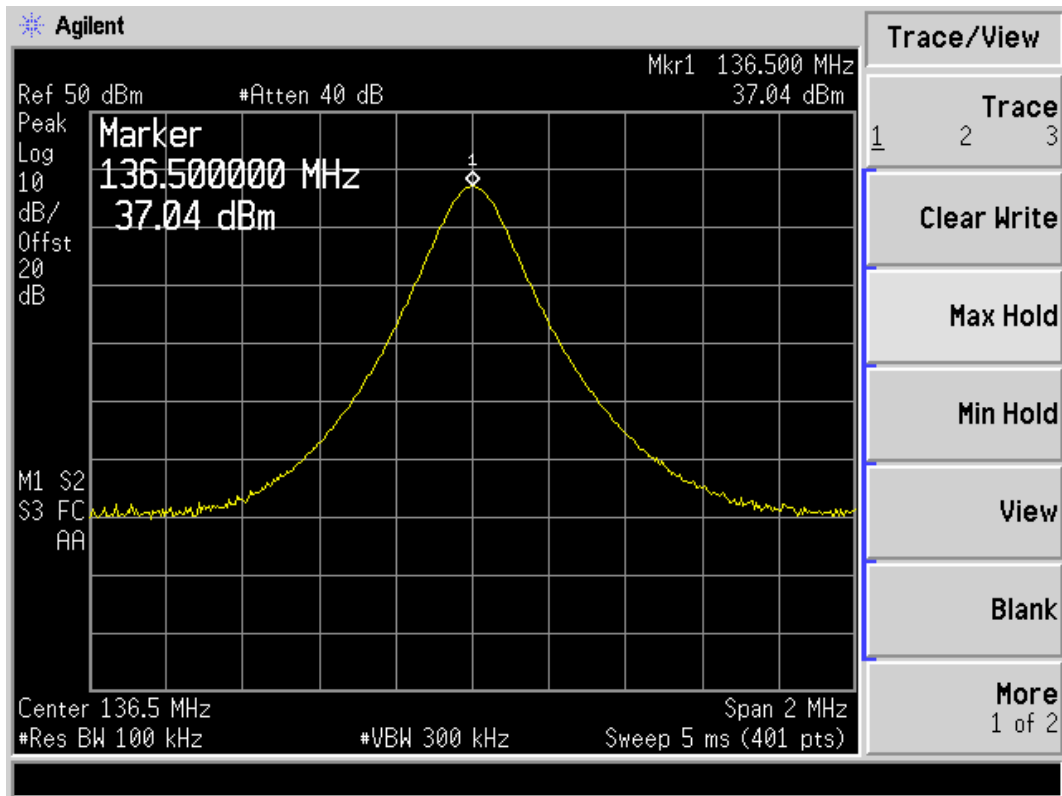
The EUT was directly connected to a RF Communication Test set by a 20 dB attenuator

TEST RESULTS

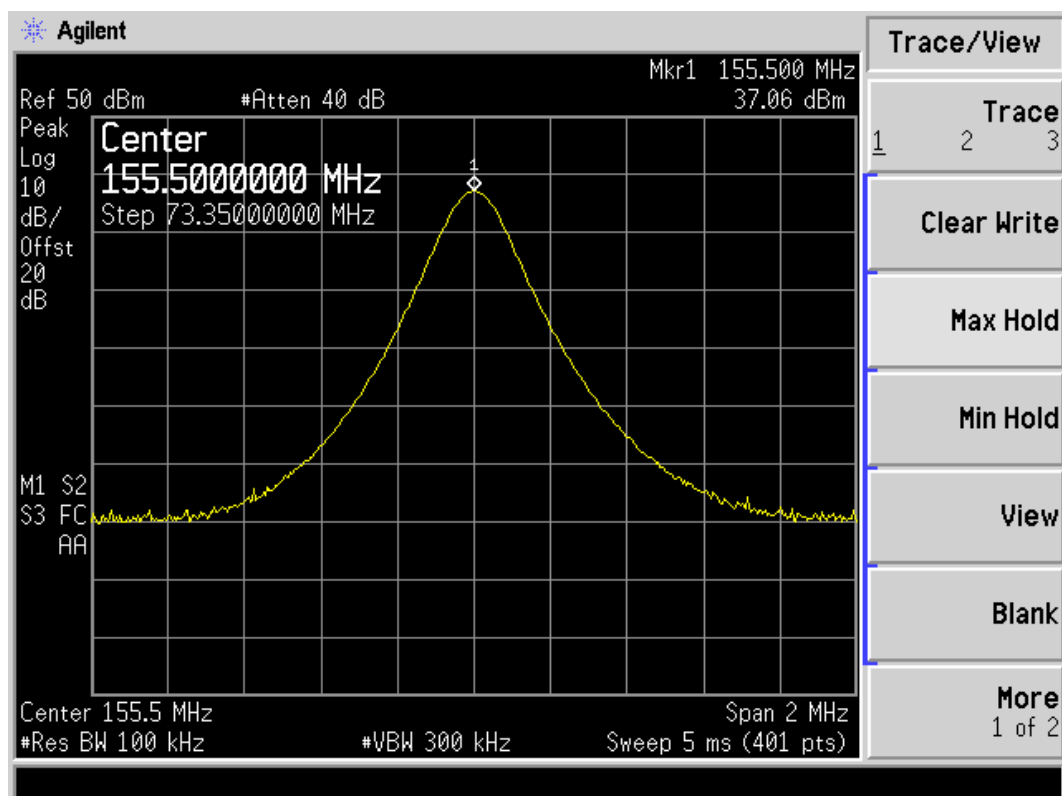
Modulation Type	Channel Separation	Test Channel	Test Frequency	Maximum Transmitter Power at Rated High Power Level(dBm)	Maximum Transmitter Power at Rated Low Power Level(dBm)
Analog/FM	12.5KHz	Low Channel	136.5000 MHz	37.04	30.50
		Middle Channel	155.5000 MHz	37.06	30.40
		High Channel	173.5000 MHz	37.00	30.30
Digital/4FSK	12.5KHz	Low Channel	136.5000 MHz	37.04	30.41
		Middle Channel	155.5000 MHz	37.01	30.38
		High Channel	173.5000 MHz	37.07	30.34
Limit		The limit is dependent upon the station’s antenna HAAT and required service area.			
Test Results		Complicance			

Plots of Maximum Transmitter Power Measurement

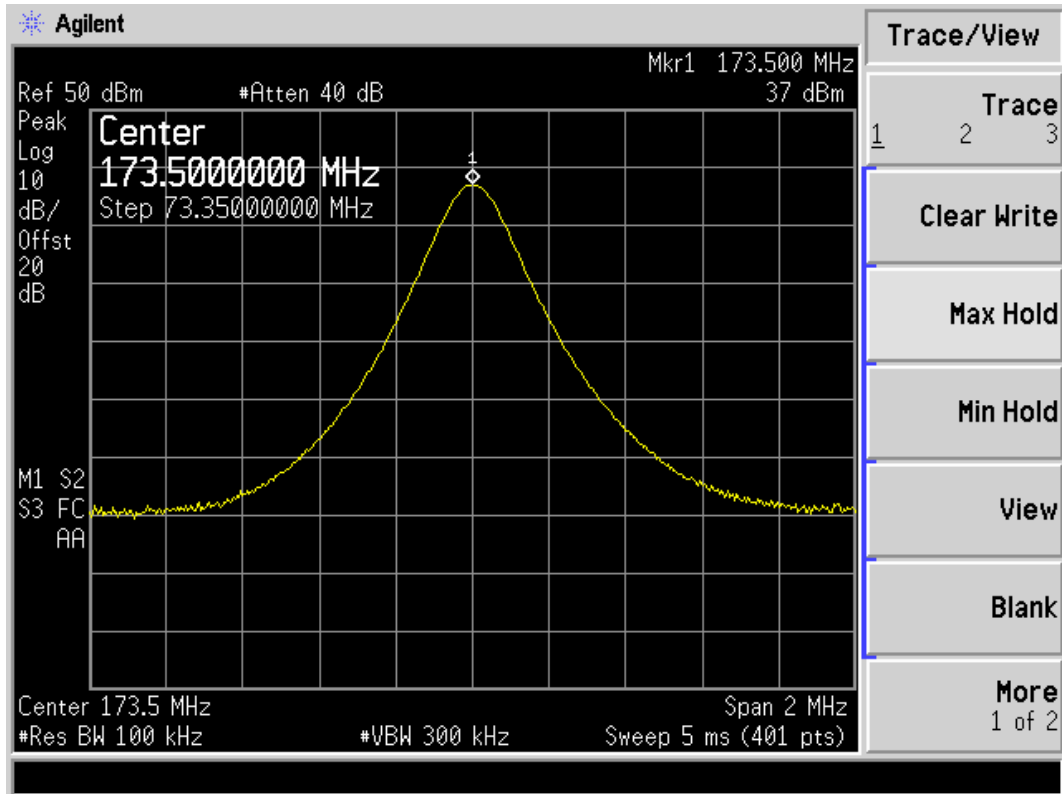
Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
FM	12.5 KHz	136.5000	5	37.04	Varies	Complicance



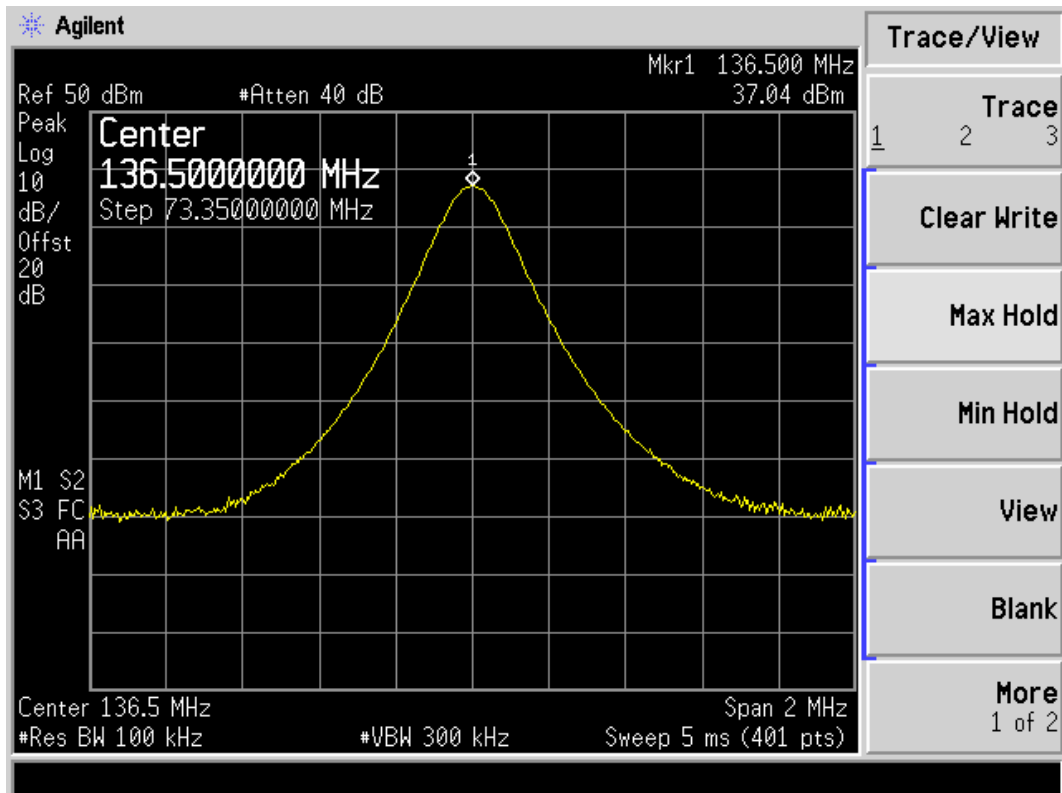
Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
FM	12.5 KHz	155.5000	5	37.06	Varies	Complicance



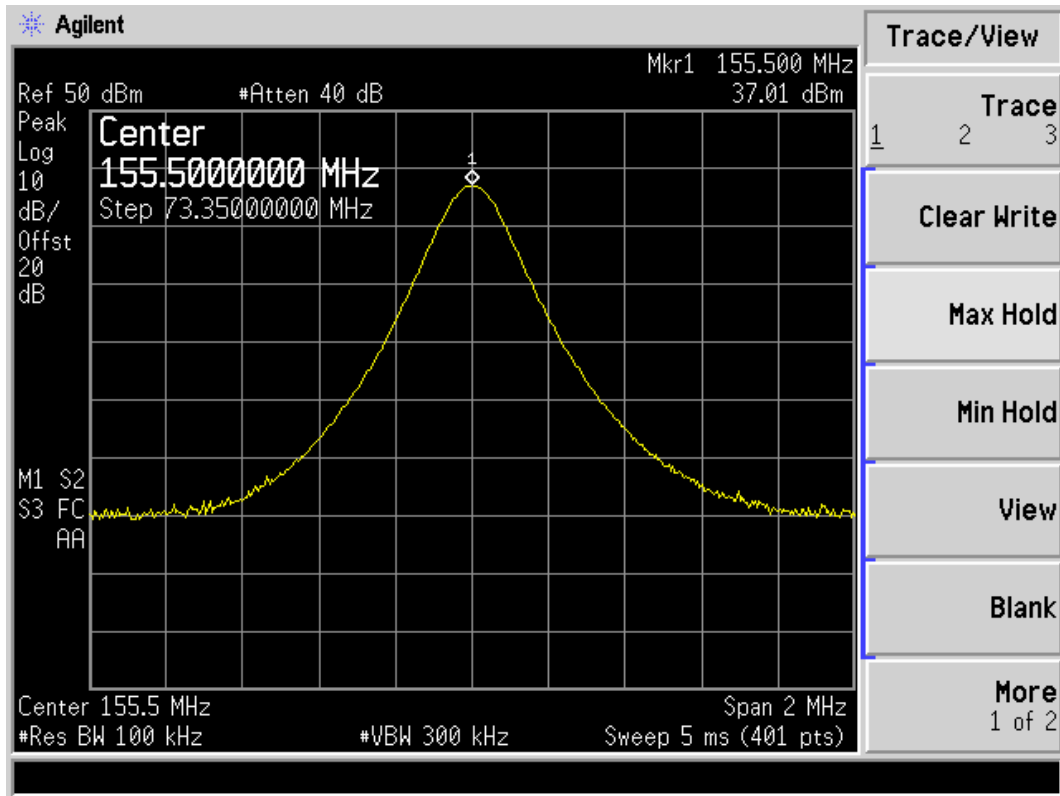
Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
FM	12.5 KHz	173.5000	5	37.00	Varies	Complicance



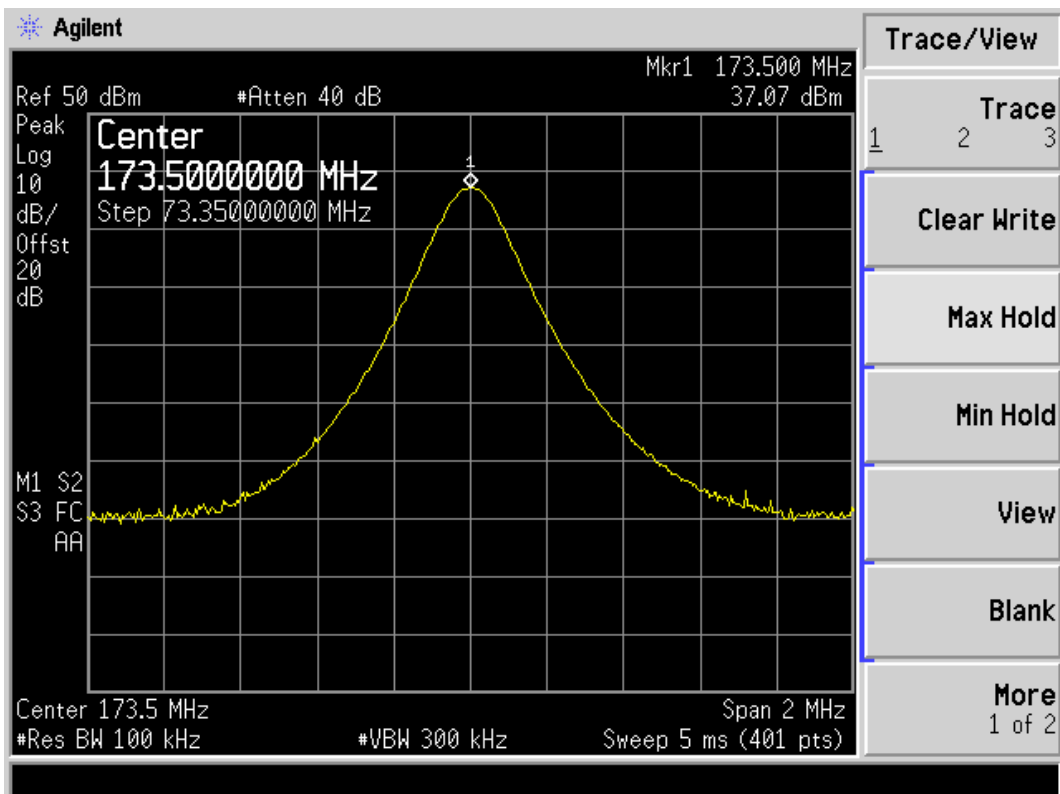
Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
4FSK	12.5 KHz	136.5000	5	37.04	Varies	Complicance



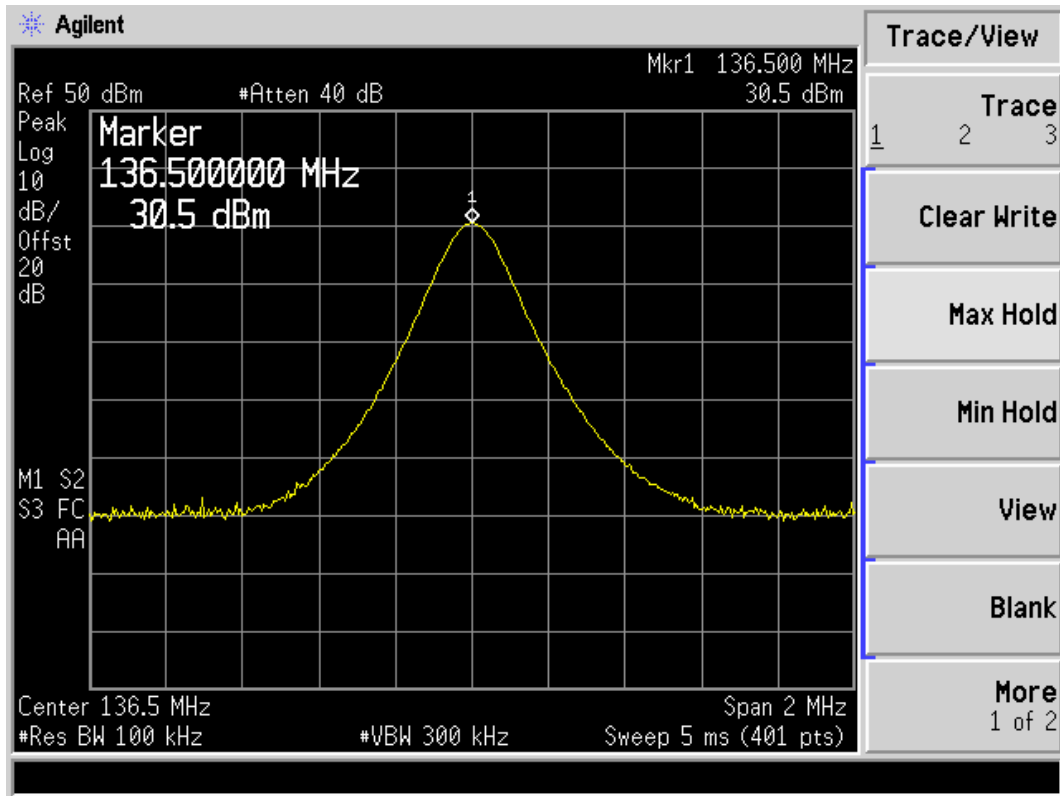
Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
4FSK	12.5 KHz	155.5000	5	37.01	Varies	Compliance



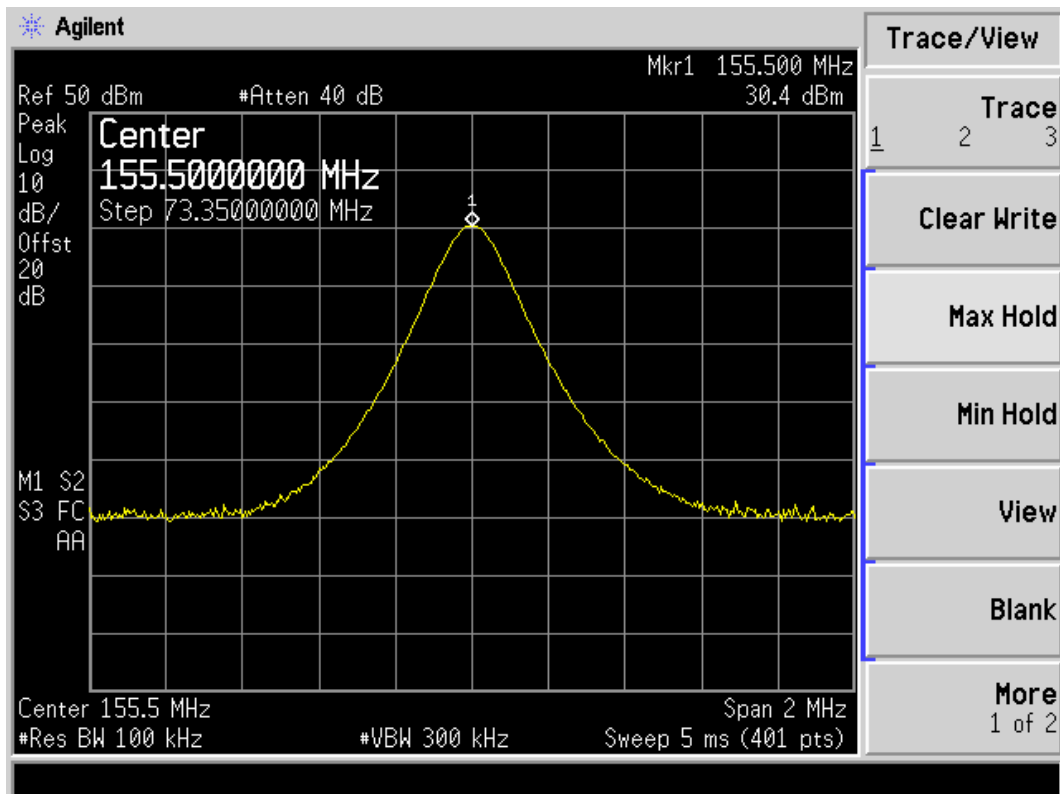
Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
4FSK	12.5 KHz	173.5000	5	37.07	Varies	Compliance



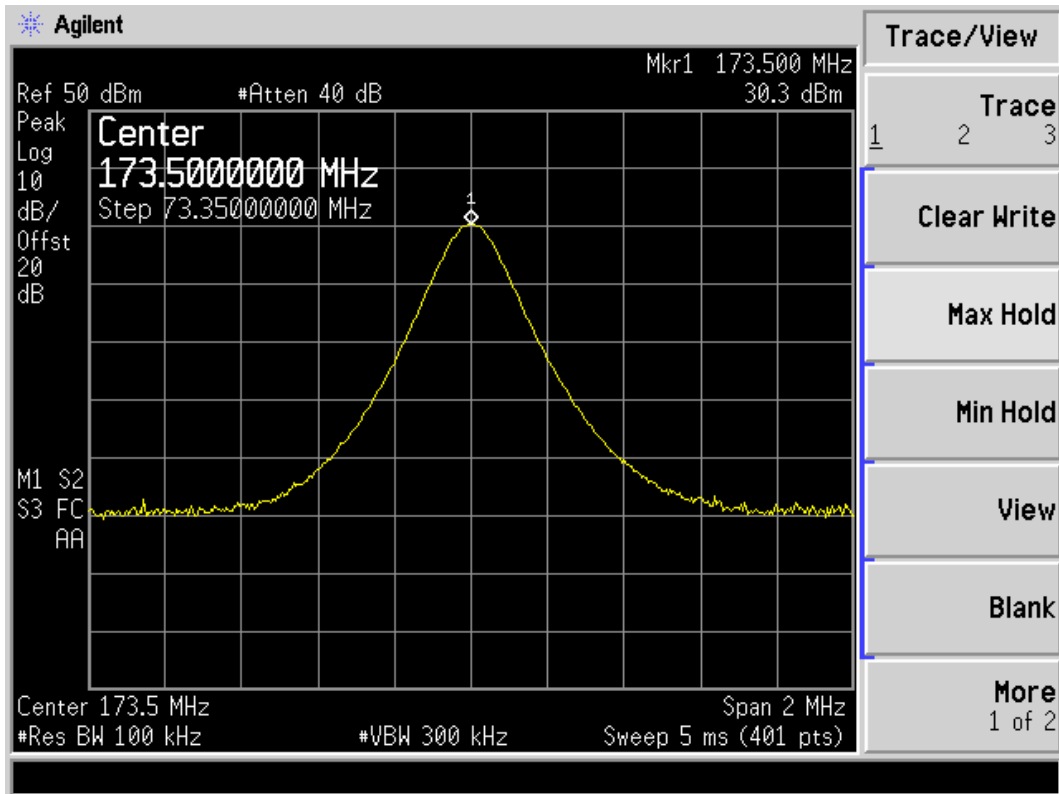
Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
FM	12.5 KHz	136.5000	1	30.50	Varies	Complicance



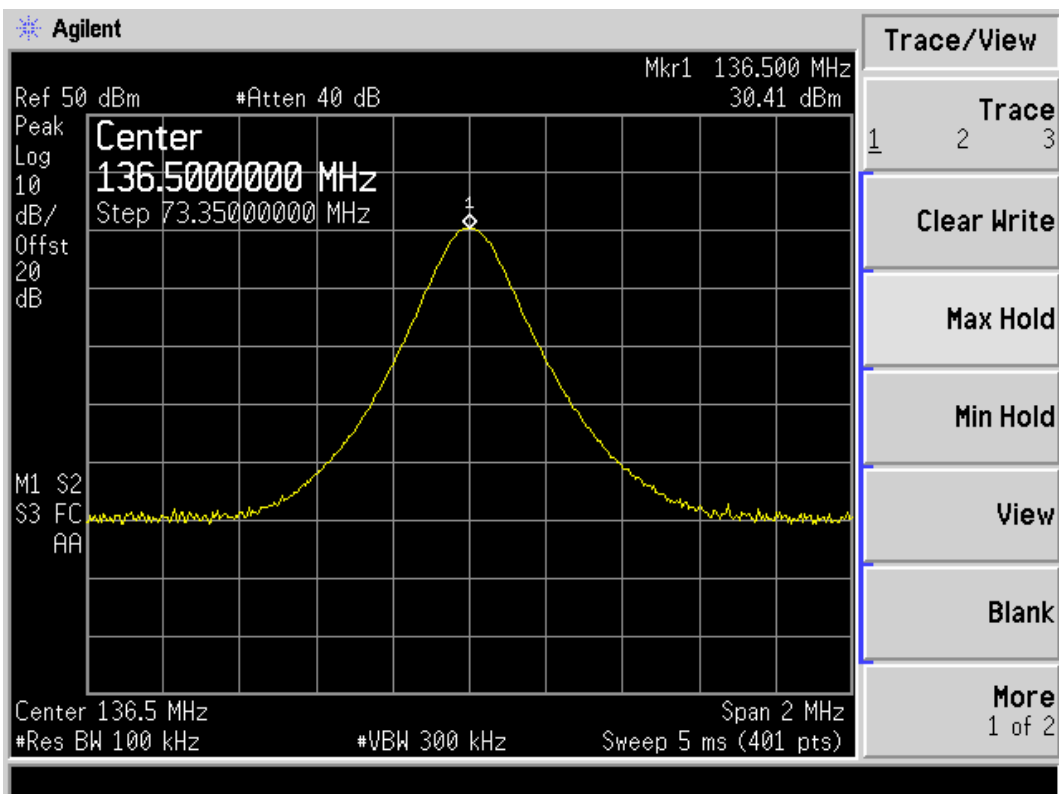
Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
FM	12.5 KHz	155.5000	1	30.40	Varies	Complicance



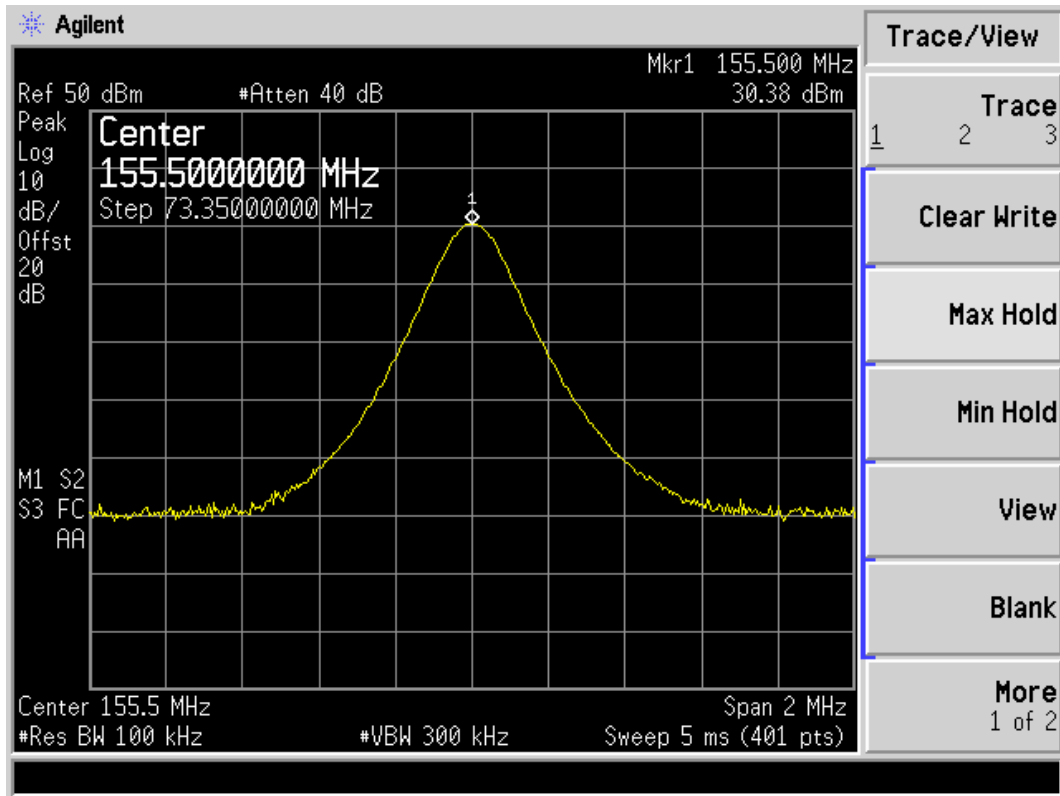
Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
FM	12.5 KHz	173.5000	1	30.30	Varies	Complicance



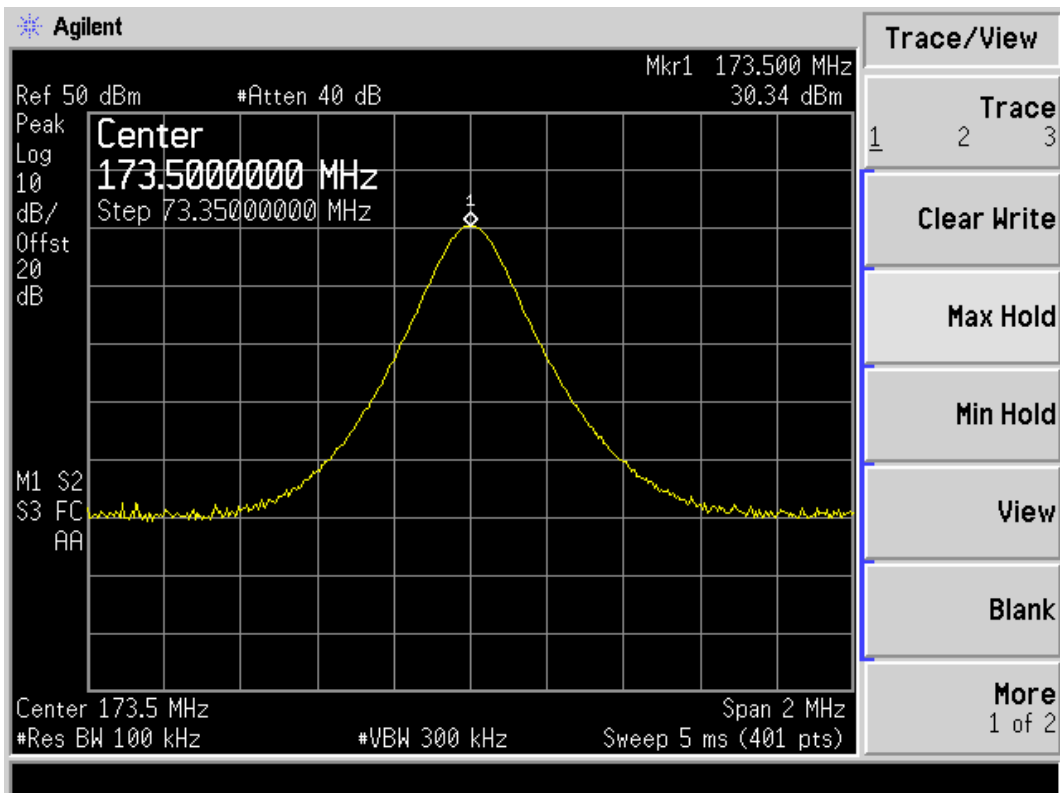
Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
4FSK	12.5 KHz	136.5000	1	30.41	Varies	Complicance



Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
4FSK	12.5 KHz	155.5000	1	30.38	Varies	Complicance



Modulation Type	Channel Separation	Freq.(MHz)	Rated Power (Watt)	Measurement (dBm)	FCC Limit	Results
4FSK	12.5 KHz	173.5000	1	30.34	Varies	Complicance



4.8. Transmitter Frequency Behavior

TEST APPLICABLE

Section 90.214

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

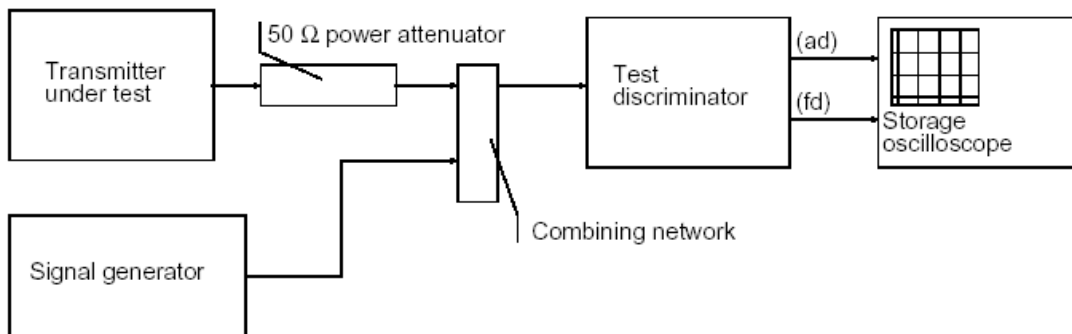
Time intervals ^{1, 2}	Maximum frequency difference ³	All equipment	
		150 to 174 MHz	421 to 512MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 KHz Channels			
t_1 ⁴	± 25.0 KHz	5.0 ms	10.0 ms
t_2	± 12.5 KHz	20.0 ms	25.0 ms
t_3 ⁴	± 25.0 KHz	5.0 ms	10.0 ms
Transient Frequency Behavior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

- 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.
- 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.
- Difference between the actual transmitter frequency and the assigned transmitter frequency.
- 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.

TEST PROCEDURE

TIA/EIA-603 2.2.19

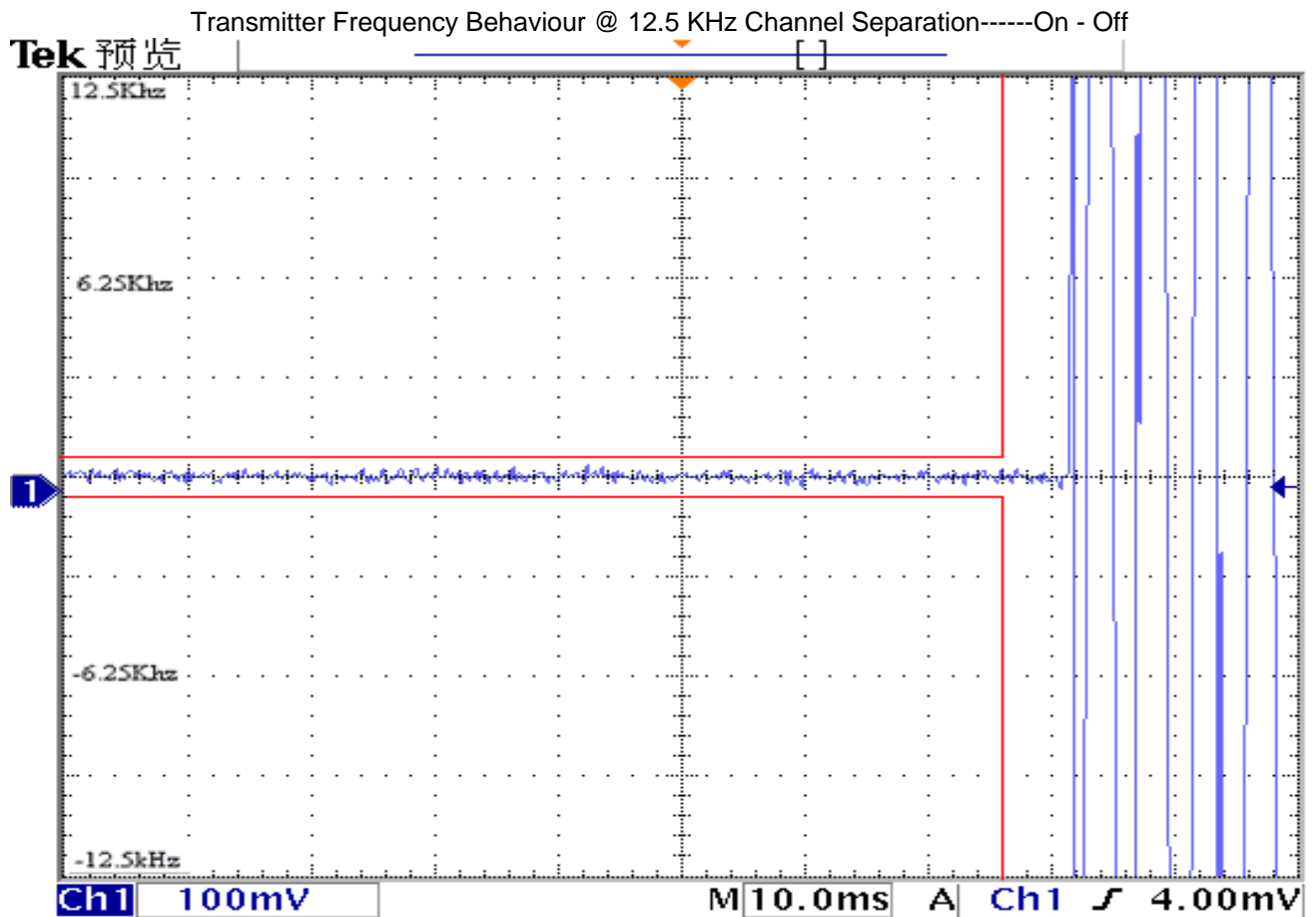
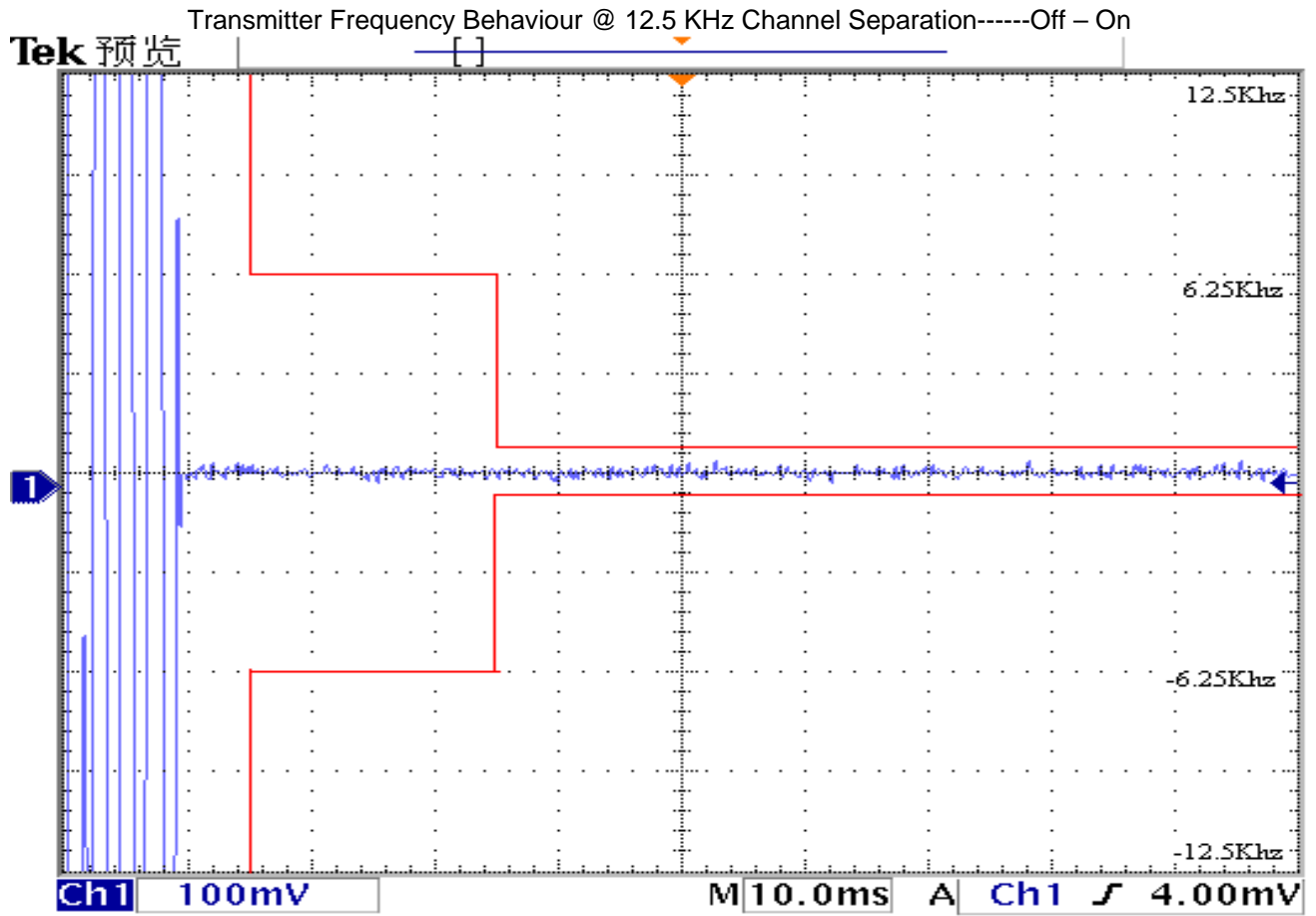
TEST CONFIGURATION



TEST RESULTS

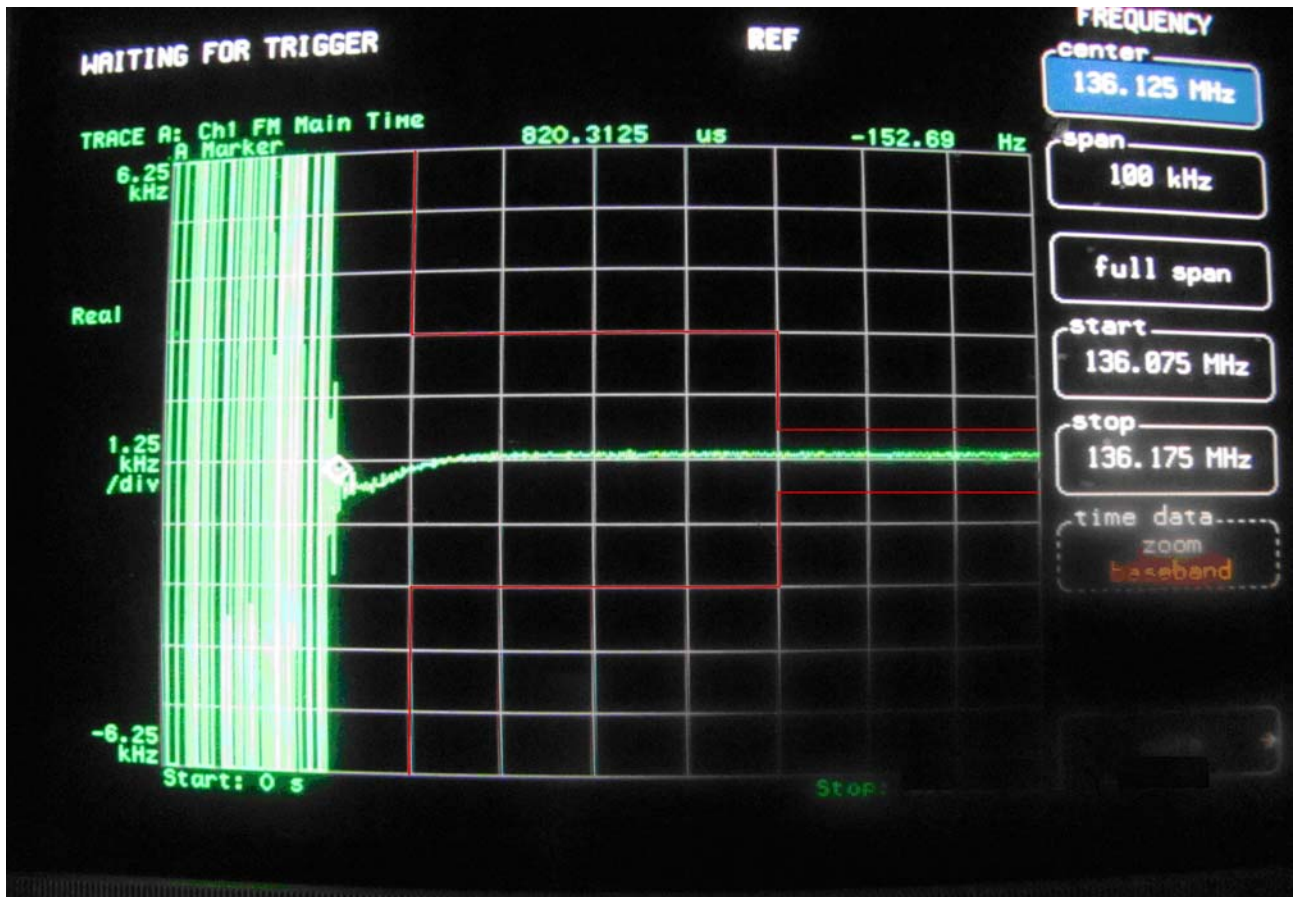
Please refer to the following plots.

Modulation Type: FM

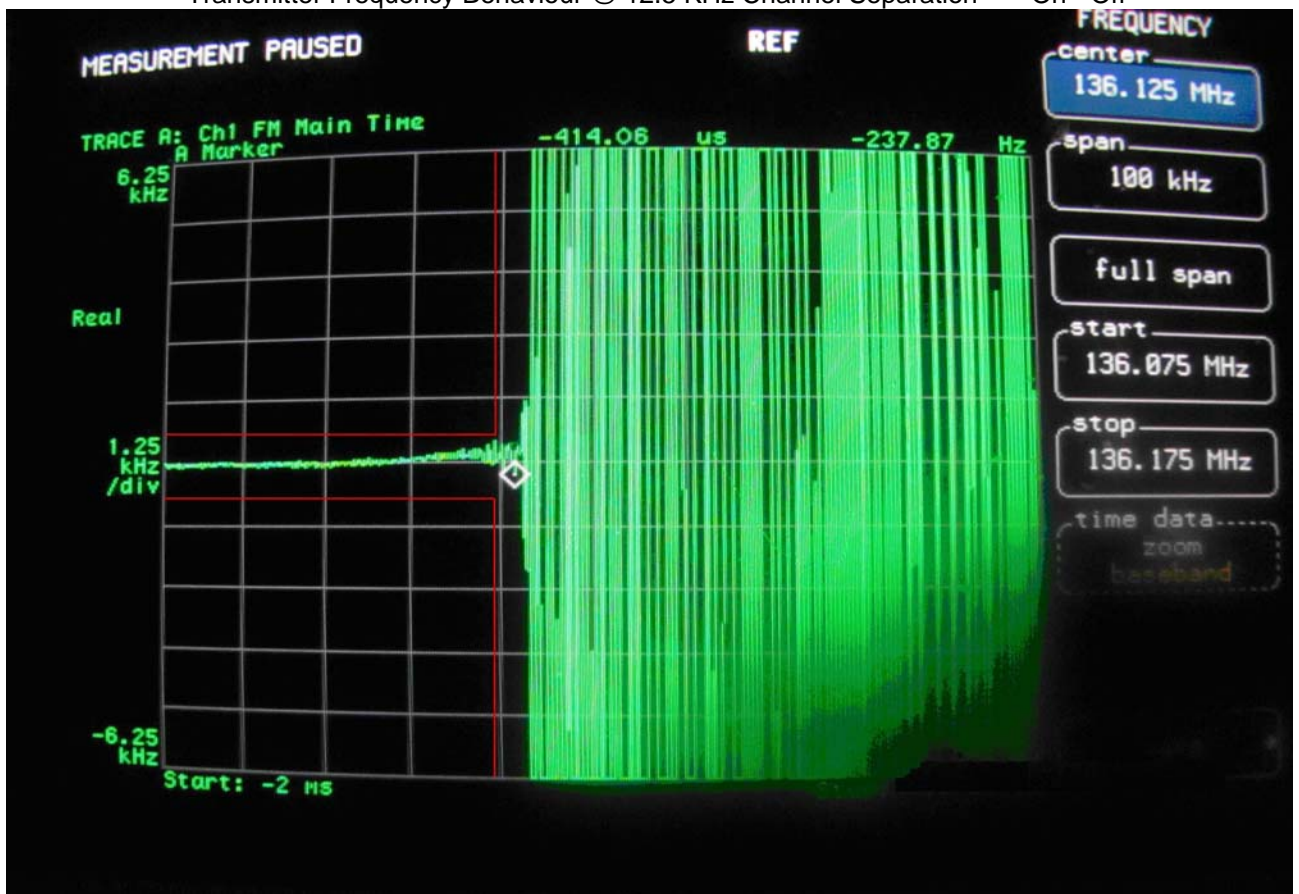


Modulation Type: 4FSK

Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation-----Off – On



Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation-----On - Off



4.9. Receiver Radiated Spurious Emission

TEST APPLICABLE

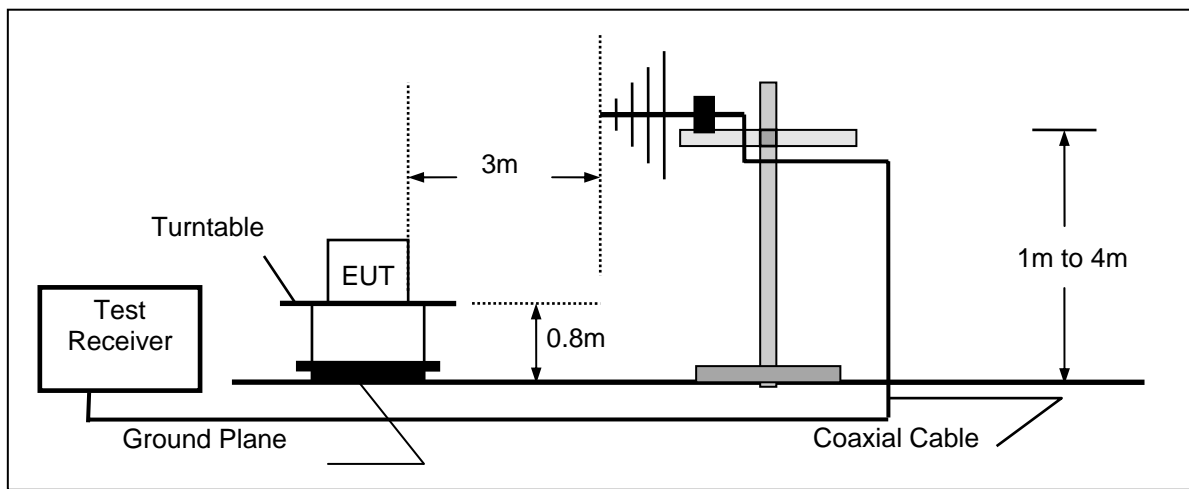
The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

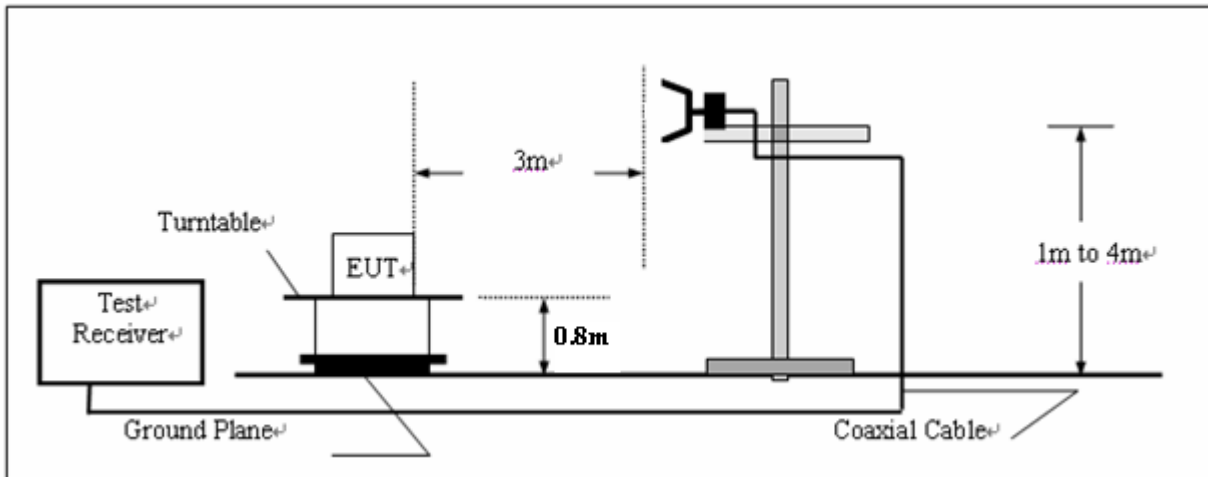
Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

TEST CONFIGURATION

(A) Radiated Emission Test Set-Up, Frequency below 1000MHz



(B) Radiated Emission Test Set-Up, Frequency above 1000MHz



TEST PROCEDURE

- 1 The EUT was placed on a turn table which is 0.8m above ground plane.
- 2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
- 3 And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 4 Repeat above procedures until all frequency measurements have been completed.

RECEIVER RADIATED SPOUIOUS LIMIT

For unintentional device, according to § 15.109(a) and RSS-Gen, except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

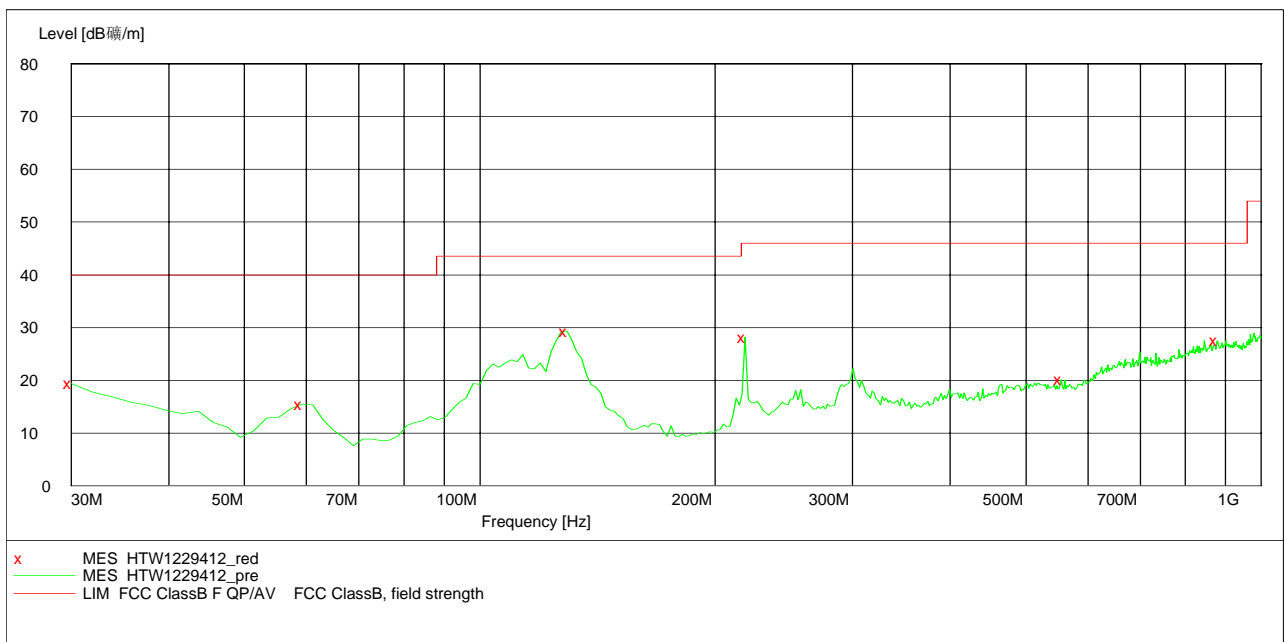
TEST RESULTS

The Radiated Measurement are performed to the three channels (the top channel, the middle channel and the bottom channel), the datum recorded below is the worst case for each channel separation; and the EUT shall be scanned from 30 MHz to the 5th harmonic of the highest oscillator frequency in the digital devices or 1 GHz whichever is higher.

Modulation Type	Channel Separation	Test Frequency (MHz)	Polar.	Maximum Radiated Emissions		FCC Limit (dBuV/m)
				Frequency (MHz)	Datum (dBuV/m)	
FM	12.5 KHz	173.5000	H	129.13	29.40	43.50
			V	41.66	30.80	40.00
Test Results			Compliance			

SWEEP TABLE: "test (30M-1G)"

Short Description: Field Strength
 Start Stop Detector Meas. IF Transducer
 Frequency Frequency Time Bandw.
 30.0 MHz 1.0 GHz MaxPeak Coupled 120 kHz HL562 201106



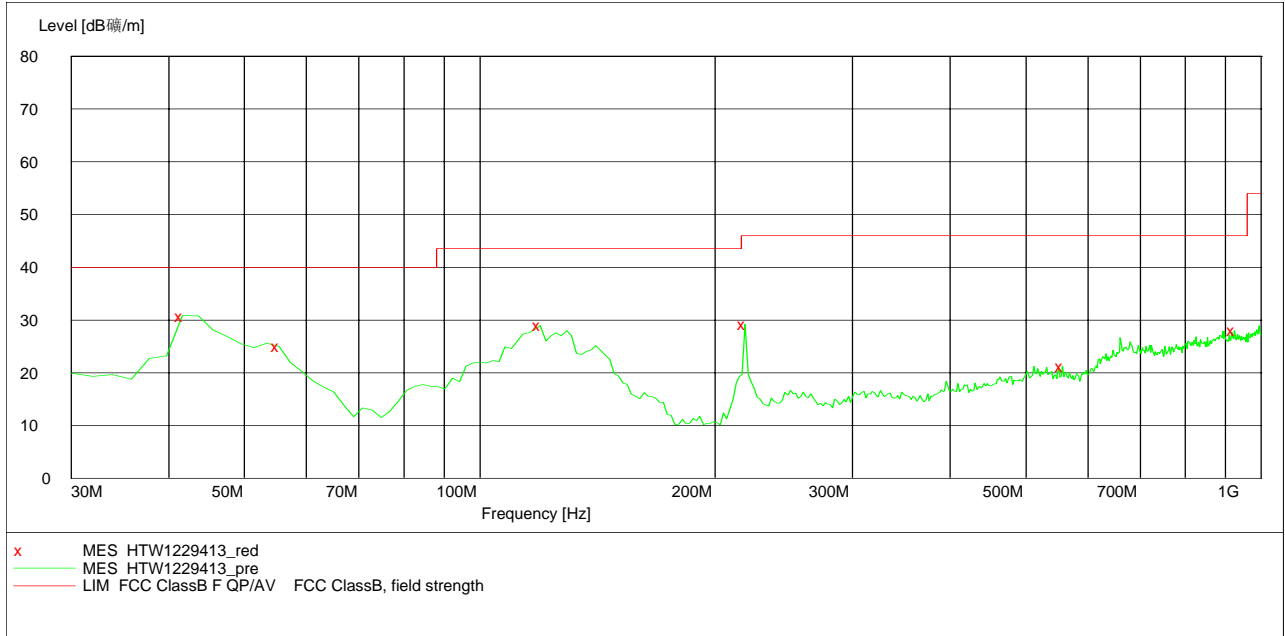
MEASUREMENT RESULT: "HTW1229412_red"

12/29/2011 12:26PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	19.40	-11.3	40.0	20.6	Peak	100.0	9.00	HORIZONTAL
59.158317	15.50	-25.0	40.0	24.5	Peak	300.0	99.00	HORIZONTAL
129.138277	29.40	-20.3	43.5	14.1	Peak	300.0	191.00	HORIZONTAL
218.557114	28.20	-20.5	46.0	17.8	Peak	100.0	241.00	HORIZONTAL
554.849699	20.10	-13.6	46.0	25.9	Peak	100.0	68.00	HORIZONTAL
877.535070	27.50	-7.0	46.0	18.5	Peak	300.0	328.00	HORIZONTAL

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 201106



MEASUREMENT RESULT: "HTW1229413_red"

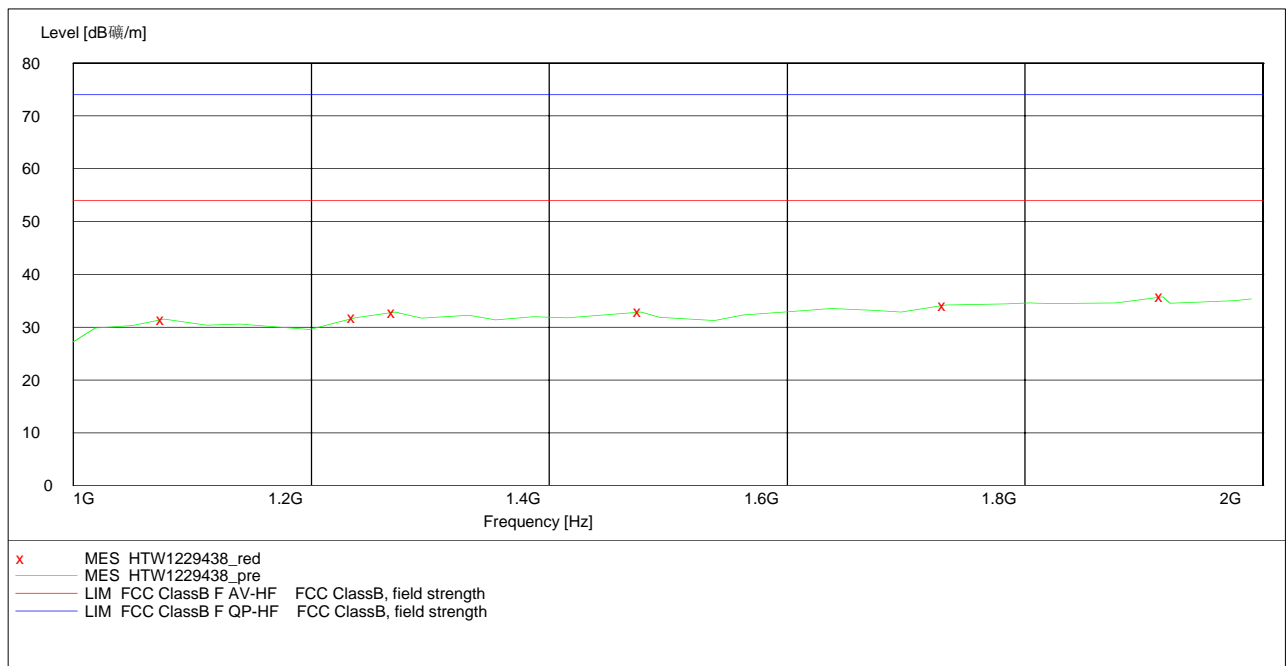
12/29/2011 12:28PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
41.663327	30.80	-17.6	40.0	9.2	Peak	100.0	36.00	VERTICAL
55.270541	25.00	-23.9	40.0	15.0	Peak	100.0	24.00	VERTICAL
119.418838	29.00	-19.3	43.5	14.5	Peak	100.0	260.00	VERTICAL
218.557114	29.20	-20.5	46.0	16.8	Peak	100.0	119.00	VERTICAL
556.793587	21.30	-13.5	46.0	24.7	Peak	100.0	317.00	VERTICAL
924.188377	28.00	-7.1	46.0	18.0	Peak	100.0	57.00	VERTICAL

Modulation Type	Channel Separation	Test Frequency (MHz)	Polar.	Maximum Radiated Emissions		FCC Limit (dBuV/m)
				Frequency (MHz)	Datum (dBuV/m)	
FM	12.5 KHz	173.5000	H	1915.83	35.80	54.00
			V	1947.90	37.70	54.00
Test Results			Compliance			

SWEEP TABLE: "test (1G-18G) P"

Short Description: EN 55022 Field Strength
 Start Stop Detector Meas. IF Transducer
 Frequency Frequency Time Bandw.
 1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz HF906 2011



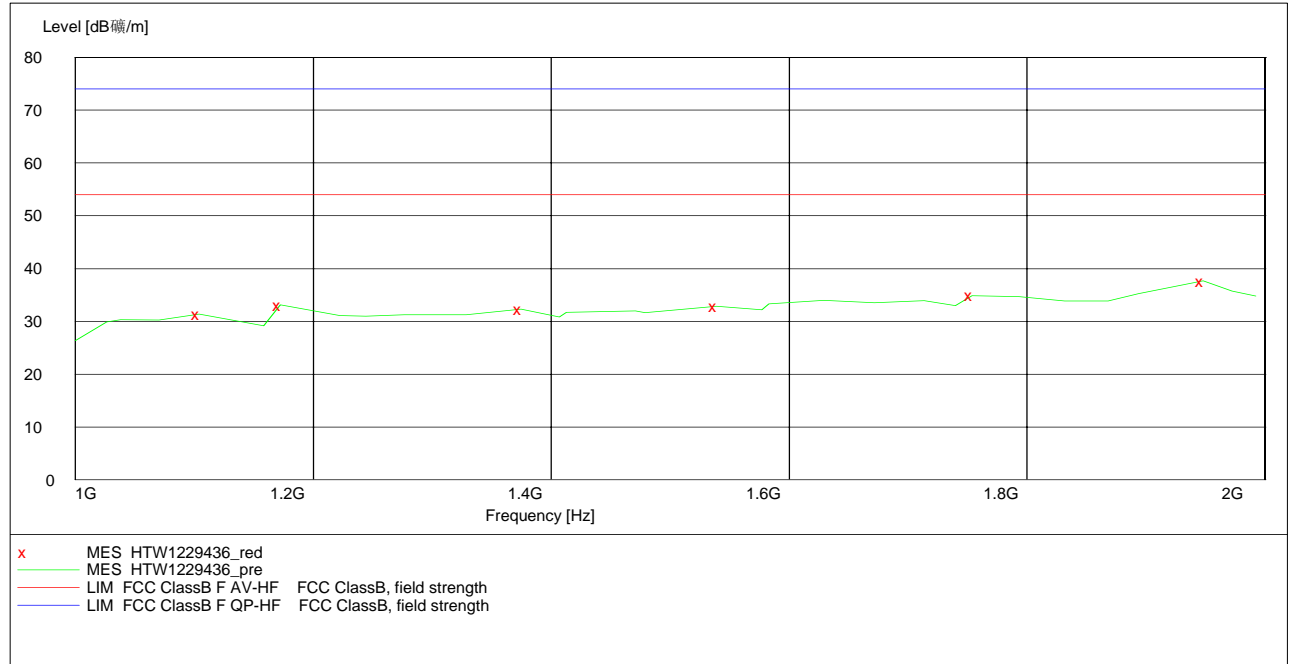
MEASUREMENT RESULT: "HTW1229438_red"

12/29/2011 4:05PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1076.152305	31.50	-26.2	54.0	22.5	Peak	100.0	273.00	HORIZONTAL
1236.472946	31.80	-25.2	54.0	22.2	Peak	100.0	36.00	HORIZONTAL
1270.541082	32.80	-25.0	54.0	21.2	Peak	100.0	337.00	HORIZONTAL
1476.953908	32.90	-23.9	54.0	21.1	Peak	100.0	144.00	HORIZONTAL
1733.466934	34.20	-21.7	54.0	19.8	Peak	100.0	296.00	HORIZONTAL
1915.831663	35.80	-20.5	54.0	18.2	Peak	100.0	200.00	HORIZONTAL

SWEEP TABLE: "test (1G-18G) P"

Short Description: EN 55022 Field Strength
 Start Stop Detector Meas. IF Transducer
 Frequency Frequency Time Bandw.
 1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz HF906 2011



MEASUREMENT RESULT: "HTW1229436_red"

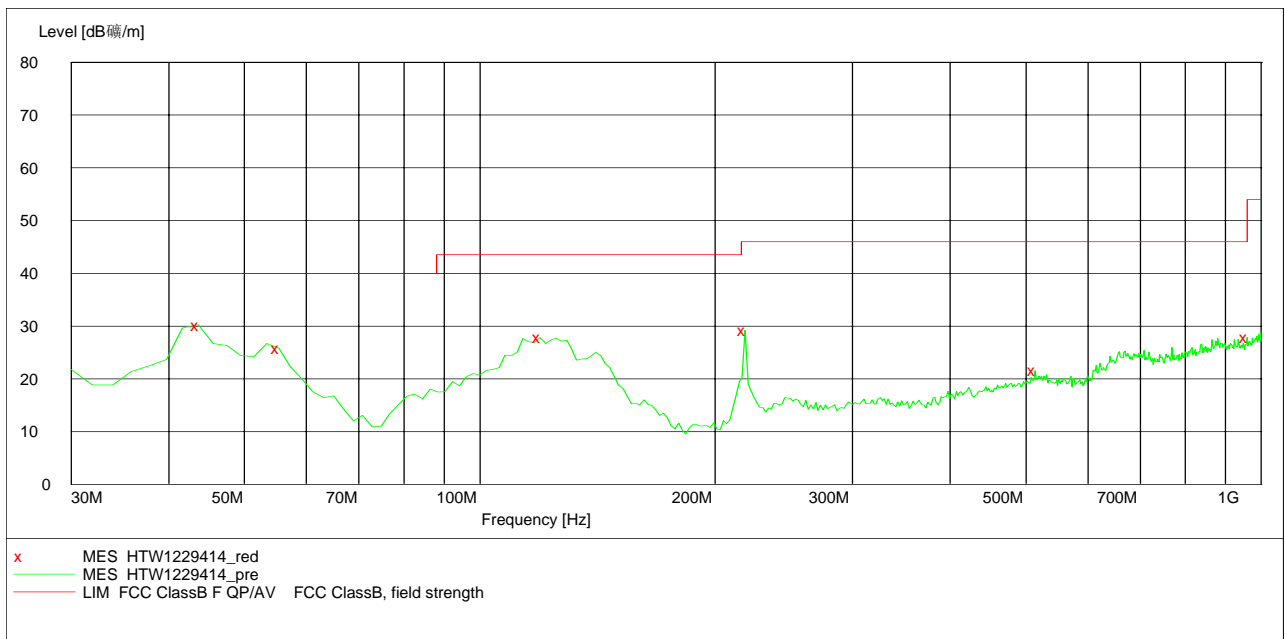
12/29/2011 4:03PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1104.208417	31.40	-26.0	54.0	22.6	Peak	100.0	125.00	VERTICAL
1172.344689	33.10	-25.6	54.0	20.9	Peak	100.0	345.00	VERTICAL
1374.749499	32.30	-24.4	54.0	21.7	Peak	100.0	56.00	VERTICAL
1539.078156	32.80	-23.4	54.0	21.2	Peak	100.0	178.00	VERTICAL
1753.507014	34.90	-21.6	54.0	19.1	Peak	100.0	227.00	VERTICAL
1947.895792	37.70	-20.2	54.0	16.3	Peak	100.0	347.00	VERTICAL

Modulation Type	Channel Separation	Test Frequency (MHz)	Polar.	Maximum Radiated Emissions		FCC Limit (dBuV/m)
				Frequency (MHz)	Datum (dBuV/m)	
4FSK	12.5 KHz	155.5000	H	129.14	29.00	43.50
			V	43.61	30.20	40.00
Test Results			Compliance			

SWEEP TABLE: "test (30M-1G)"

Short Description: Field Strength
 Start Stop Detector Meas. IF Transducer
 Frequency Frequency Time Bandw.
 30.0 MHz 1.0 GHz MaxPeak Coupled 120 kHz HL562 201106



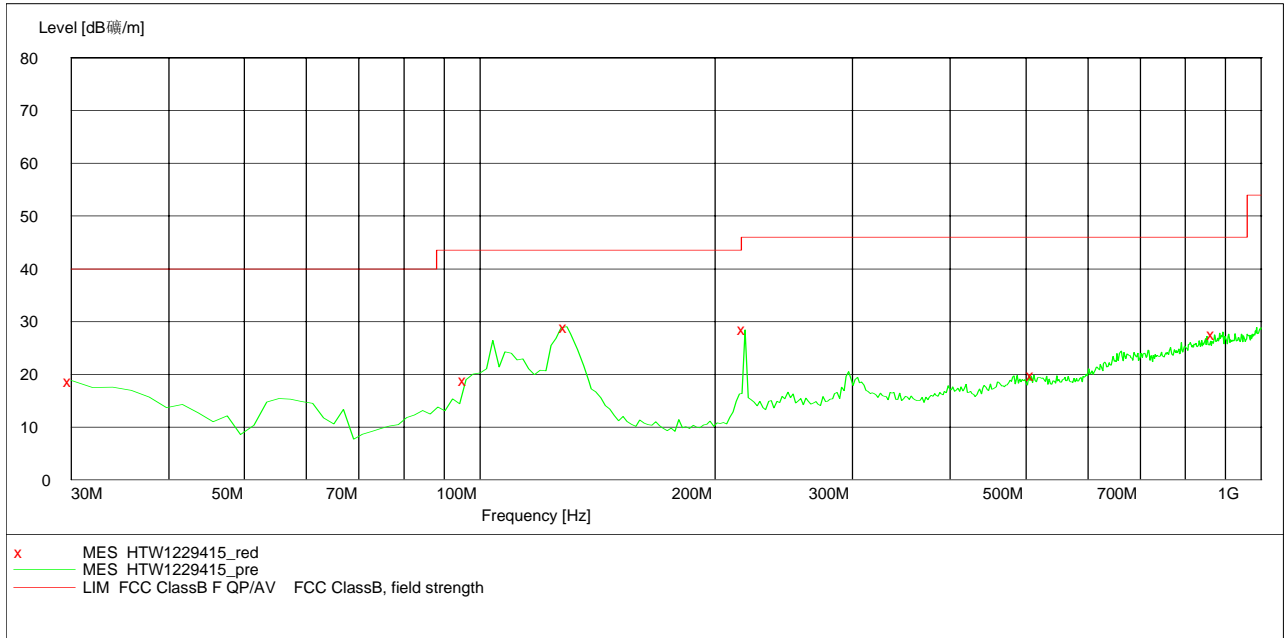
MEASUREMENT RESULT: "HTW1229414_red"

12/29/2011 12:30PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
43.607214	30.20	-18.6	40.0	9.8	Peak	100.0	27.00	VERTICAL
55.270541	25.80	-23.9	40.0	14.2	Peak	100.0	80.00	VERTICAL
119.418838	27.90	-19.3	43.5	15.6	Peak	100.0	6.00	VERTICAL
218.557114	29.20	-20.5	46.0	16.8	Peak	100.0	69.00	VERTICAL
514.028056	21.50	-13.1	46.0	24.5	Peak	100.0	134.00	VERTICAL
959.178357	27.80	-6.9	46.0	18.2	Peak	100.0	161.00	VERTICAL

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	120 kHz	HL562 201106



MEASUREMENT RESULT: "HTW1229415_red"

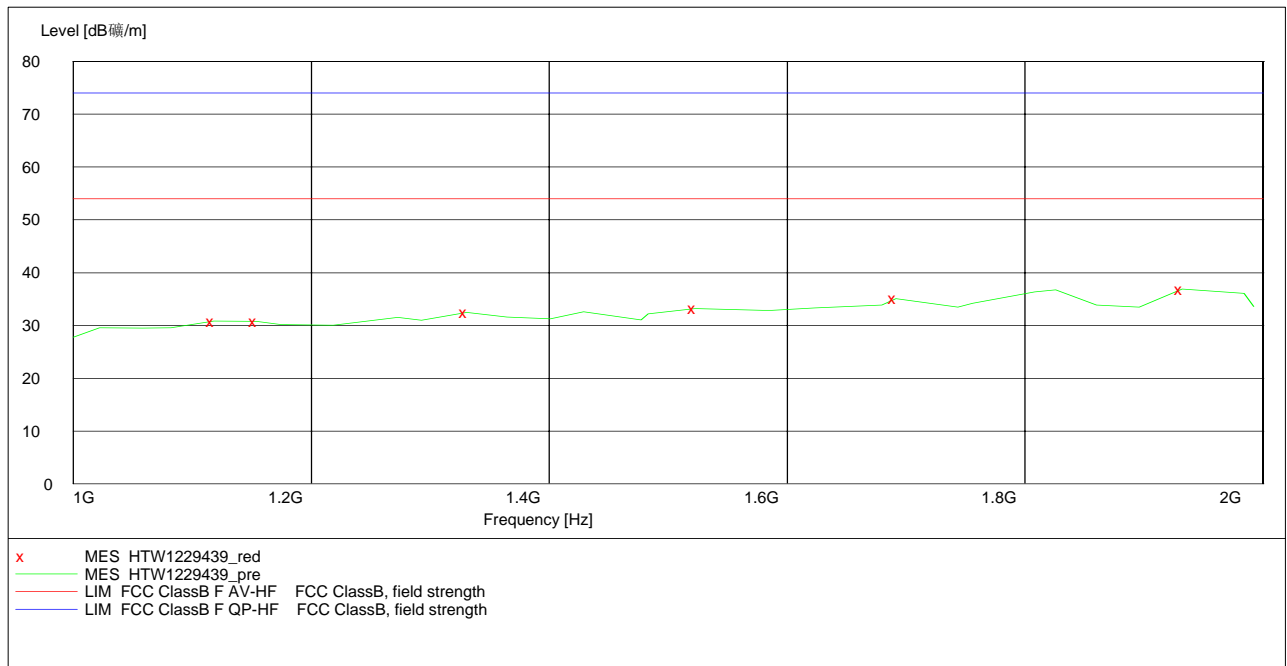
12/29/2011 12:35PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	18.80	-11.3	40.0	21.2	Peak	300.0	66.00	HORIZONTAL
96.092184	18.90	-19.9	43.5	24.6	Peak	300.0	170.00	HORIZONTAL
129.138277	29.00	-20.3	43.5	14.5	Peak	300.0	206.00	HORIZONTAL
218.557114	28.50	-20.5	46.0	17.5	Peak	100.0	245.00	HORIZONTAL
512.084168	19.80	-13.1	46.0	26.2	Peak	100.0	360.00	HORIZONTAL
871.703407	27.50	-6.9	46.0	18.5	Peak	300.0	191.00	HORIZONTAL

Modulation Type	Channel Separation	Test Frequency (MHz)	Polar.	Maximum Radiated Emissions		FCC Limit (dBuV/m)
				Frequency (MHz)	Datum (dBuV/m)	
4FSK	12.5 KHz	155.5000	H	1931.86	36.90	54.00
			V	1989.98	36.00	54.00
Test Results			Compliance			

SWEEP TABLE: "test (1G-18G) P"

Short Description: EN 55022 Field Strength
 Start Stop Detector Meas. IF Transducer
 Frequency Frequency Time Bandw.
 1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz HF906 2011



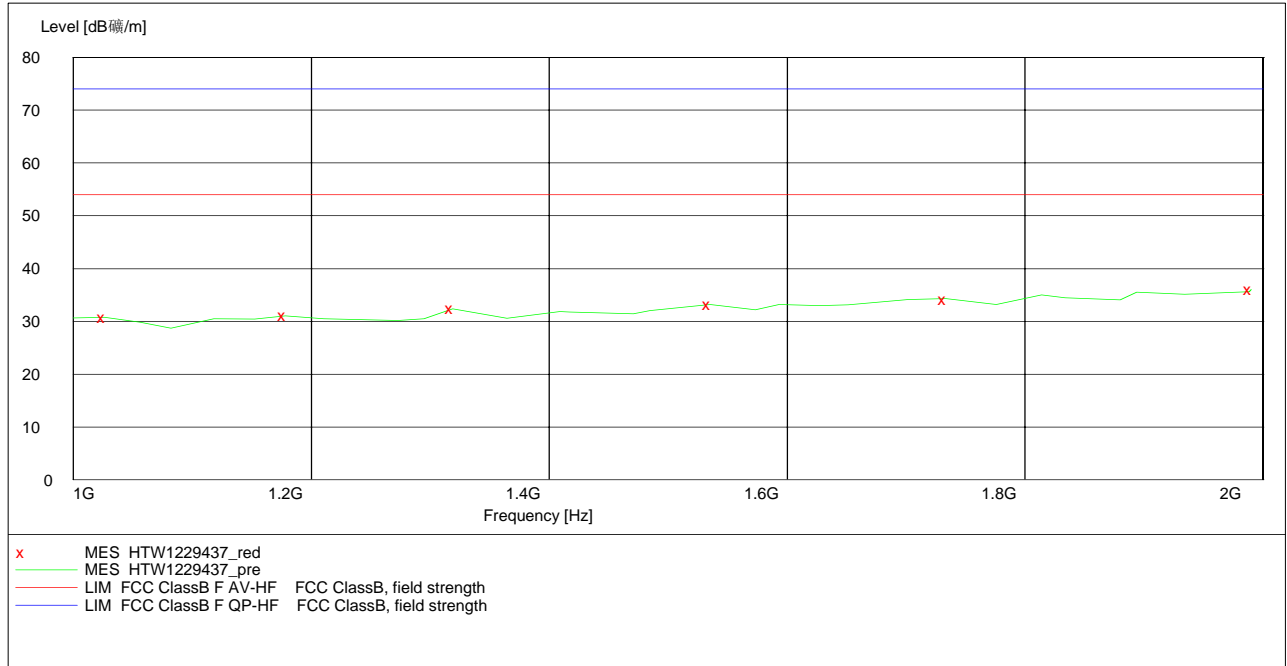
MEASUREMENT RESULT: "HTW1229439_red"

12/29/2011 4:06PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1118.236473	30.80	-25.9	54.0	23.2	Peak	100.0	360.00	HORIZONTAL
1154.308617	30.80	-25.7	54.0	23.2	Peak	100.0	125.00	HORIZONTAL
1330.661323	32.40	-24.6	54.0	21.6	Peak	100.0	36.00	HORIZONTAL
1523.046092	33.20	-23.5	54.0	20.8	Peak	100.0	111.00	HORIZONTAL
1691.382766	35.10	-22.1	54.0	18.9	Peak	100.0	78.00	HORIZONTAL
1931.863727	36.90	-20.3	54.0	17.1	Peak	100.0	307.00	HORIZONTAL

SWEEP TABLE: "test (1G-18G) P"

Short Description: EN 55022 Field Strength
 Start Stop Detector Meas. IF Transducer
 Frequency Frequency Time Bandw.
 1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz HF906 2011



MEASUREMENT RESULT: "HTW1229437_red"

12/29/2011 4:04PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1026.052104	30.80	-26.6	54.0	23.2	Peak	100.0	125.00	VERTICAL
1178.356713	31.10	-25.5	54.0	22.9	Peak	100.0	79.00	VERTICAL
1318.637275	32.40	-24.7	54.0	21.6	Peak	100.0	167.00	VERTICAL
1535.070140	33.20	-23.4	54.0	20.8	Peak	100.0	243.00	VERTICAL
1733.466934	34.30	-21.7	54.0	19.7	Peak	100.0	319.00	VERTICAL
1989.979960	36.00	-19.9	54.0	18.0	Peak	100.0	53.00	VERTICAL

4.10. Receiver Conducted Spurious Emission

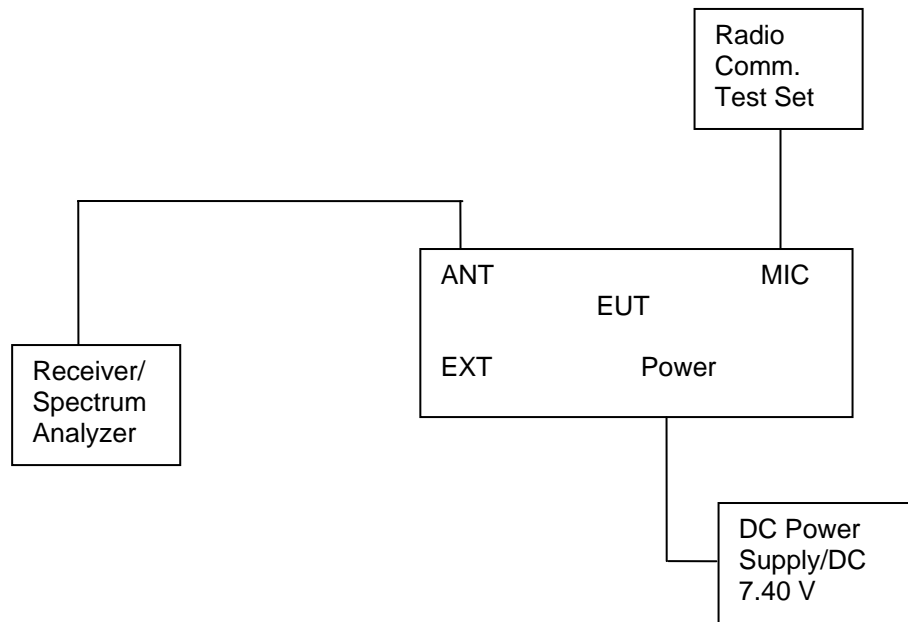
TEST APPLICABLE

The same as Section 4.3

TEST PROCEDURE

The spectrum analyzer was connected to the RF output power of the EUT, the EUT was setup in receiving mode; The RBW of the spectrum analyzer was set to 100 kHz and the VBW set to 300 KHz below the test frequency 1GHz. While the RBW of the spectrum analyzer was set to the 1MHz and VBW set to the 3MHz from 1GHz to the 10th harmonic.

TEST CONFIGURATION



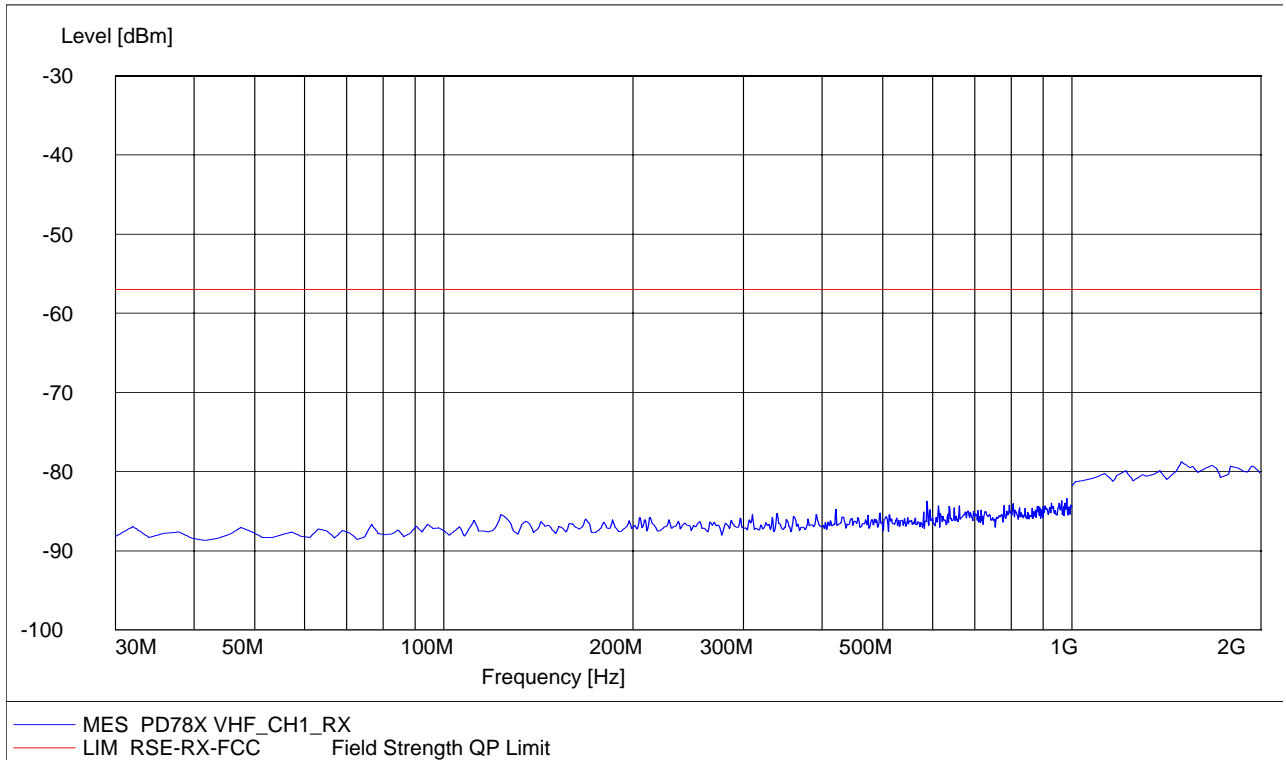
LIMIT

The power at the antenna terminal shall not exceed 2.0 nanowatts (-57dBm).

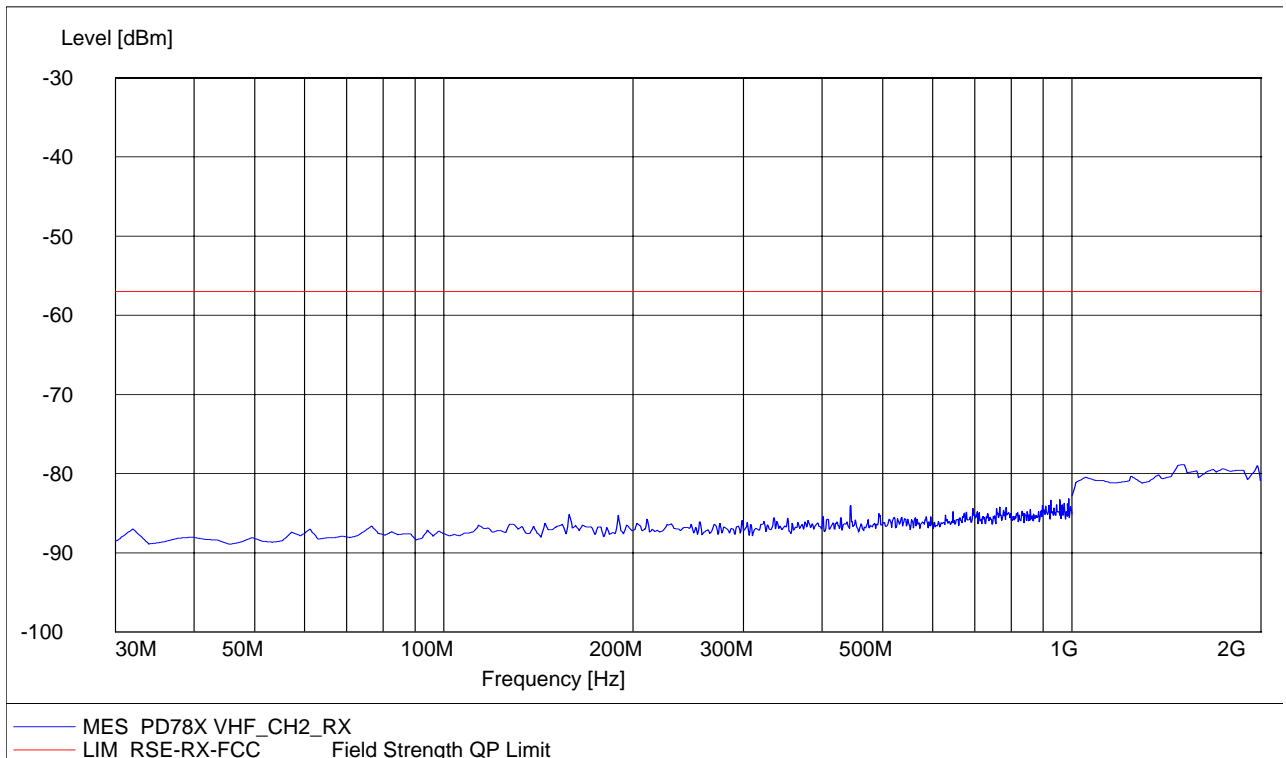
TEST RESULTS

The Receiver Conducted Spurious Emissions Measurement is performed to the three channels (the top channel, the middle channel and the bottom channel), the datums recorded below were for the three channels; and the EUT shall be scanned from 30 MHz to the 2 GHz.

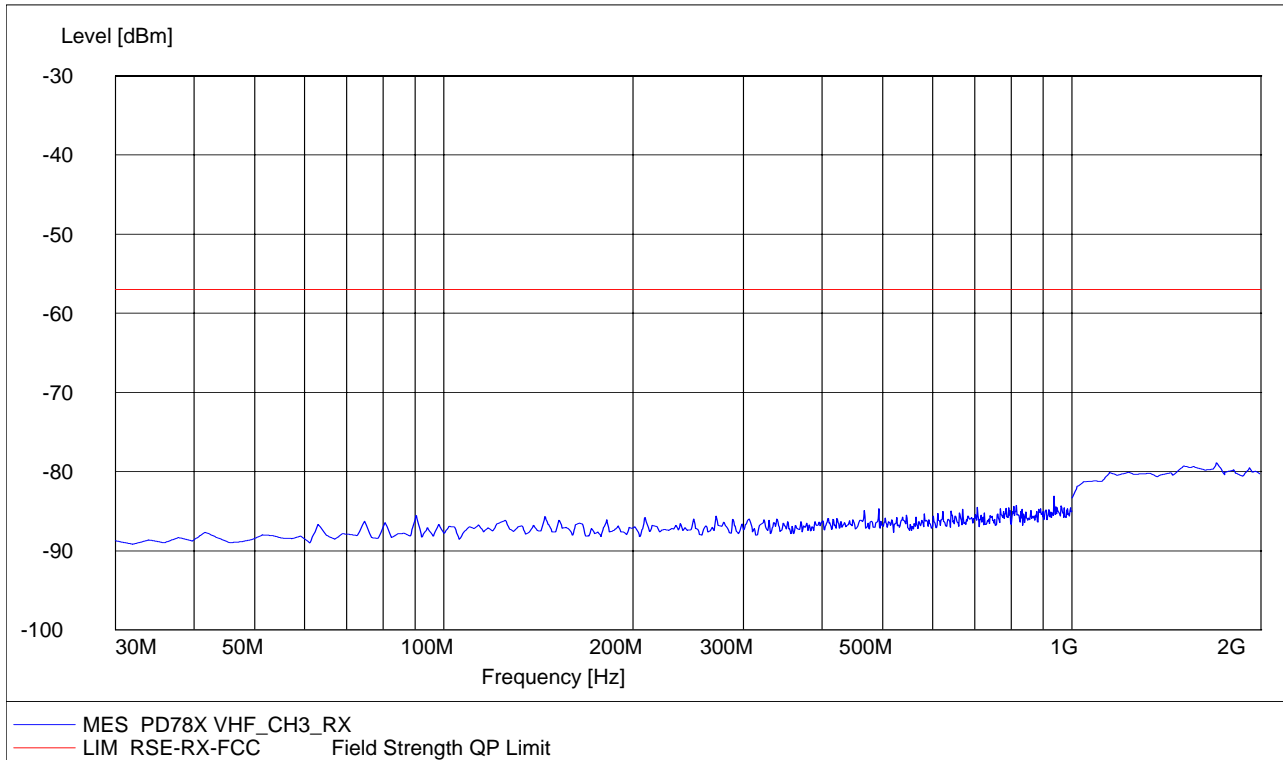
The Low Channel of FM 12.5 KHz Channel Separation



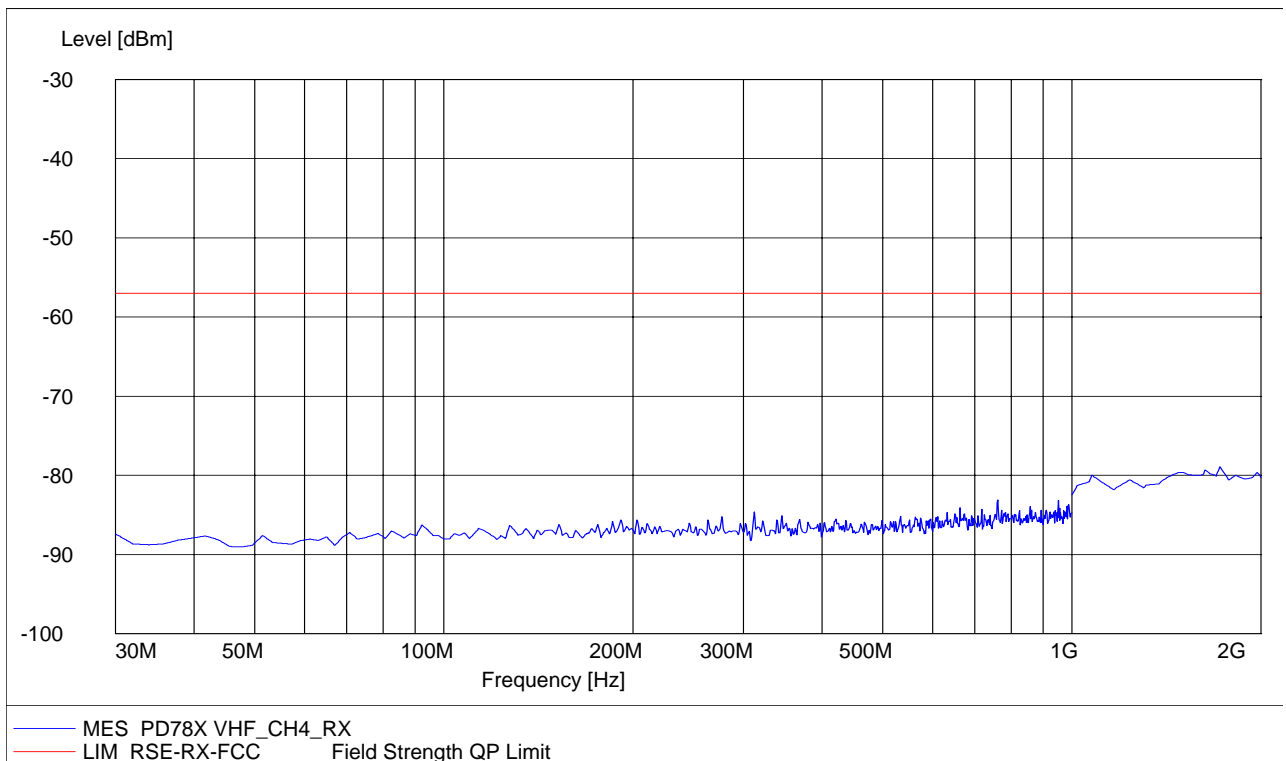
The Mid Channel of FM 12.5 KHz Channel Separation



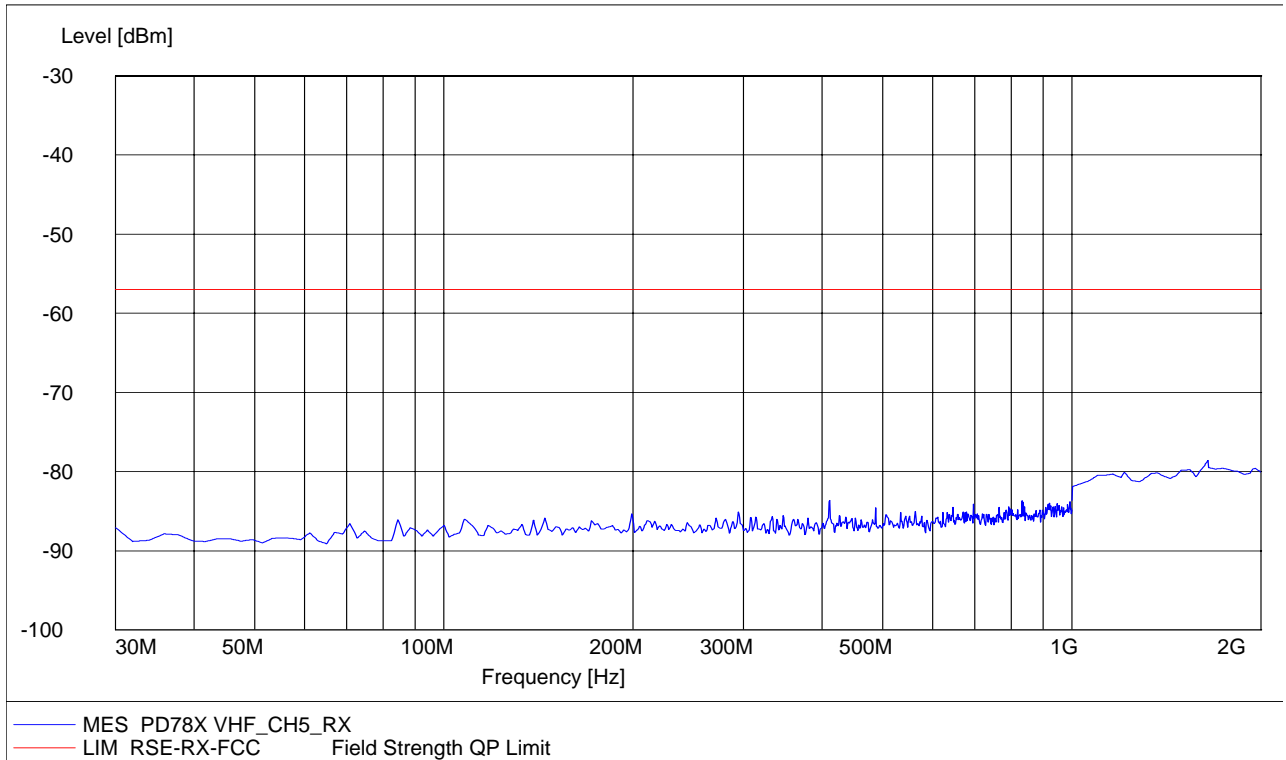
The High Channel of FM 12.5 KHz Channel Separation



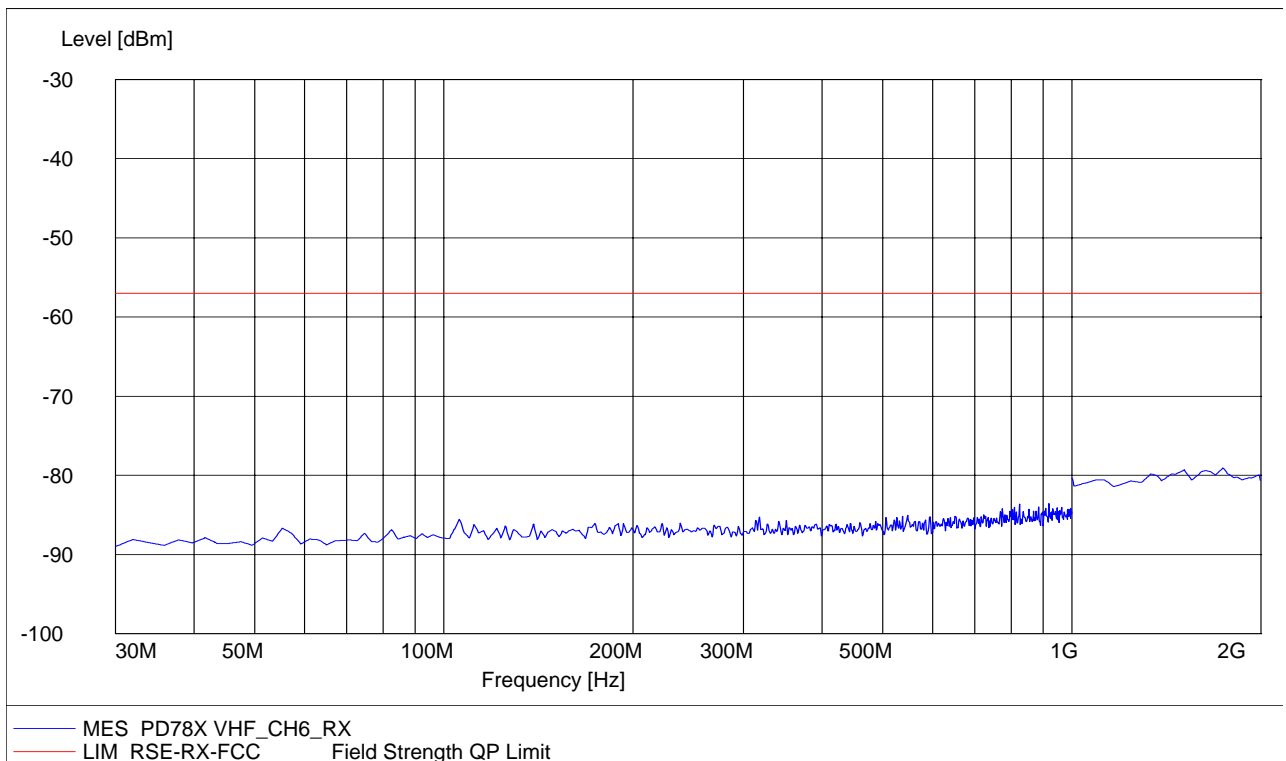
The Low Channel of 4FSK 12.5 KHz Channel Separation



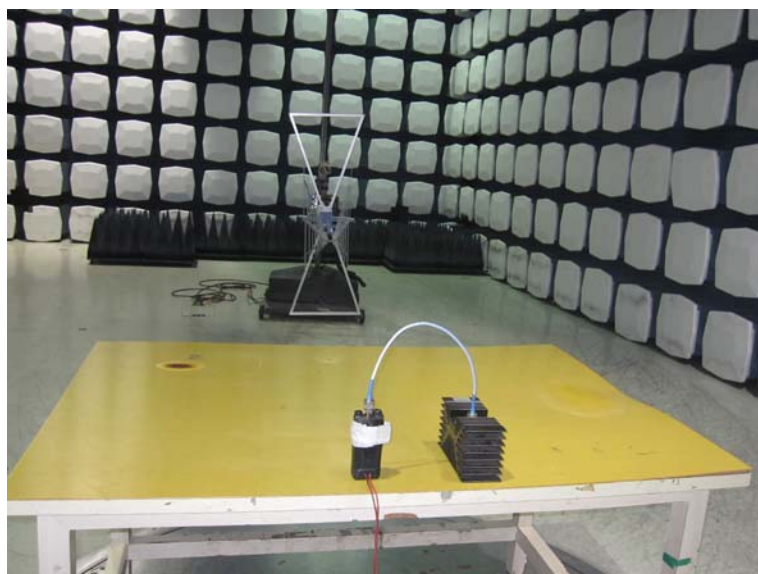
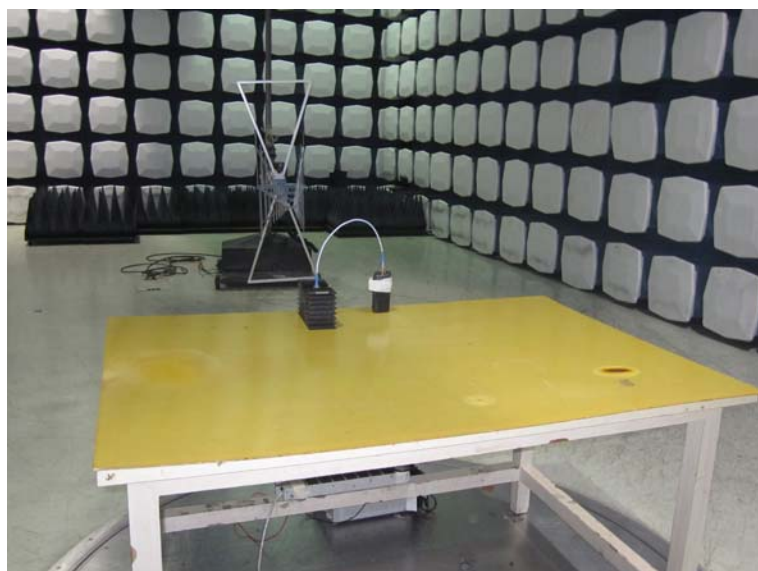
The Mid Channel of 4FSK 12.5 KHz Channel Separation

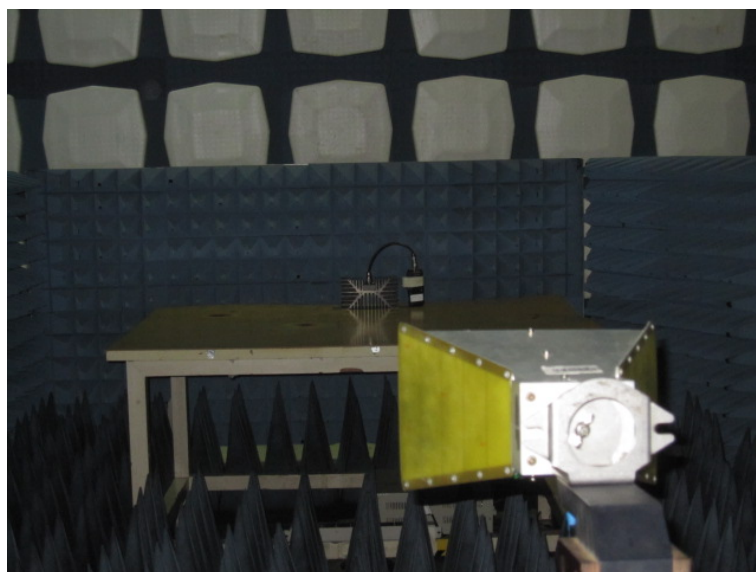
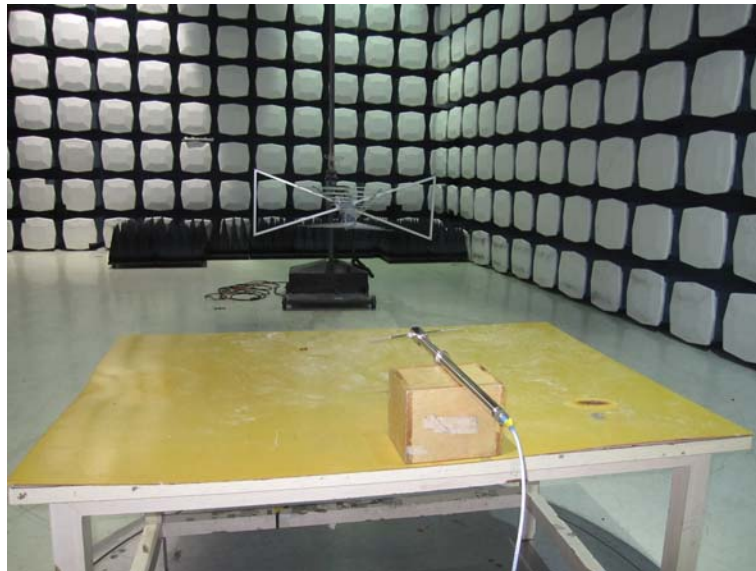
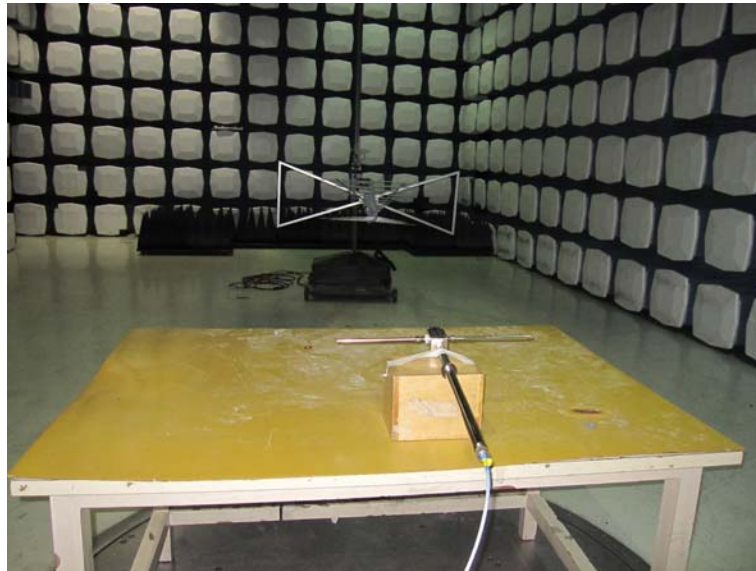


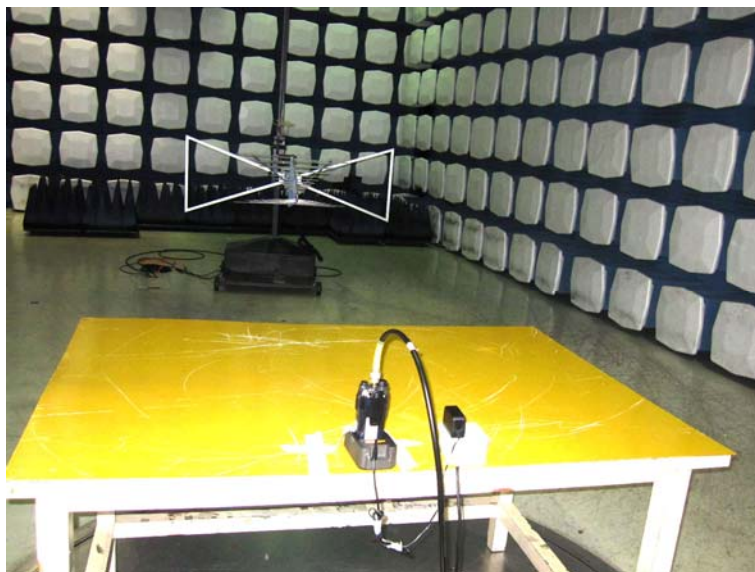
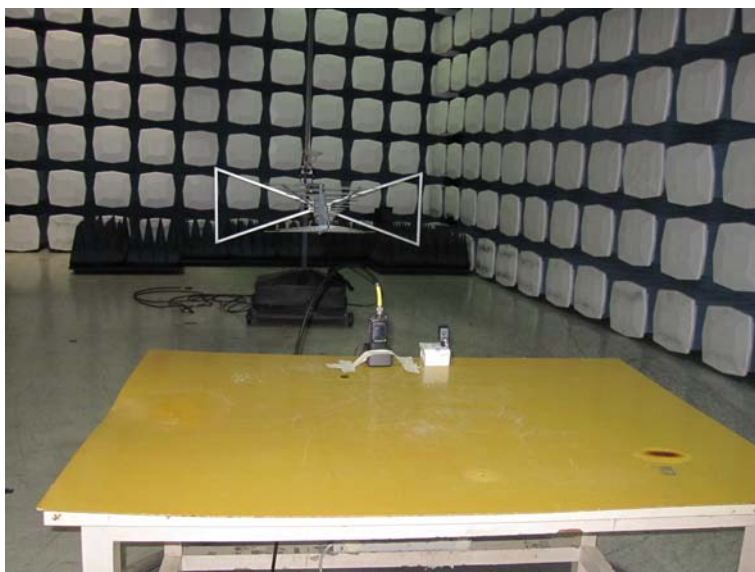
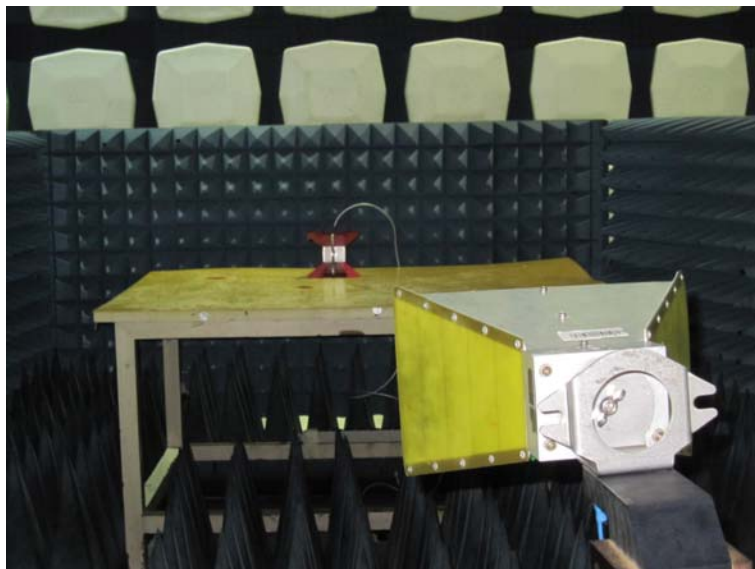
The High Channel of 4FSK 12.5 KHz Channel Separation



5. Test Setup Photos of the EUT









6. External and Internal Photos of the EUT

External Photos



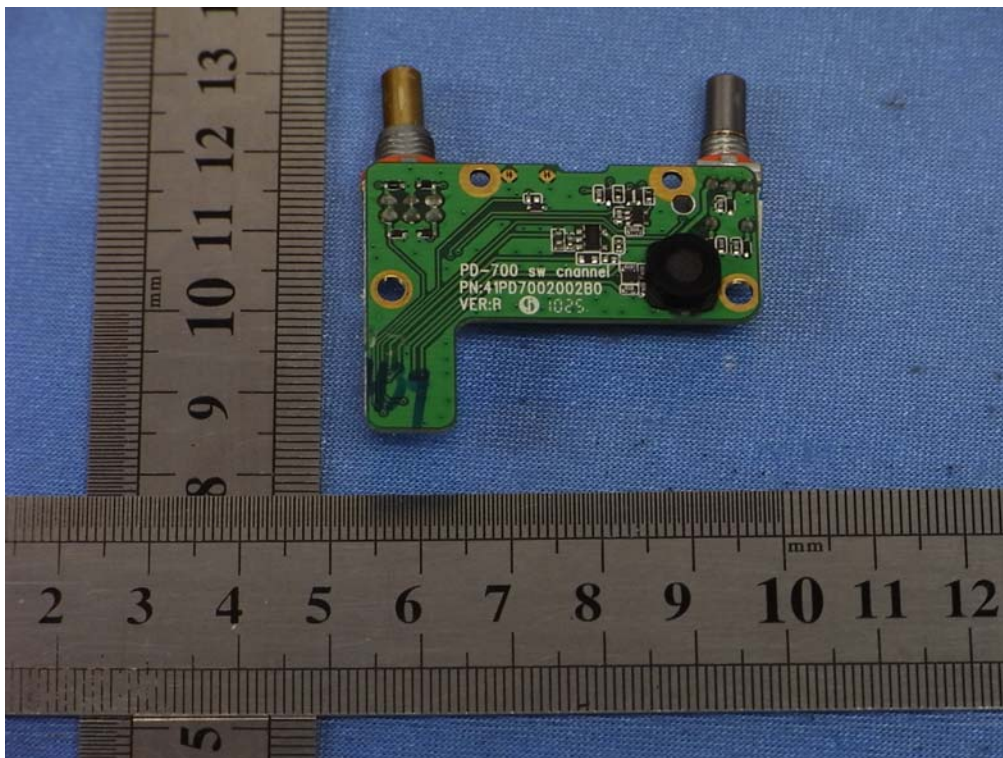


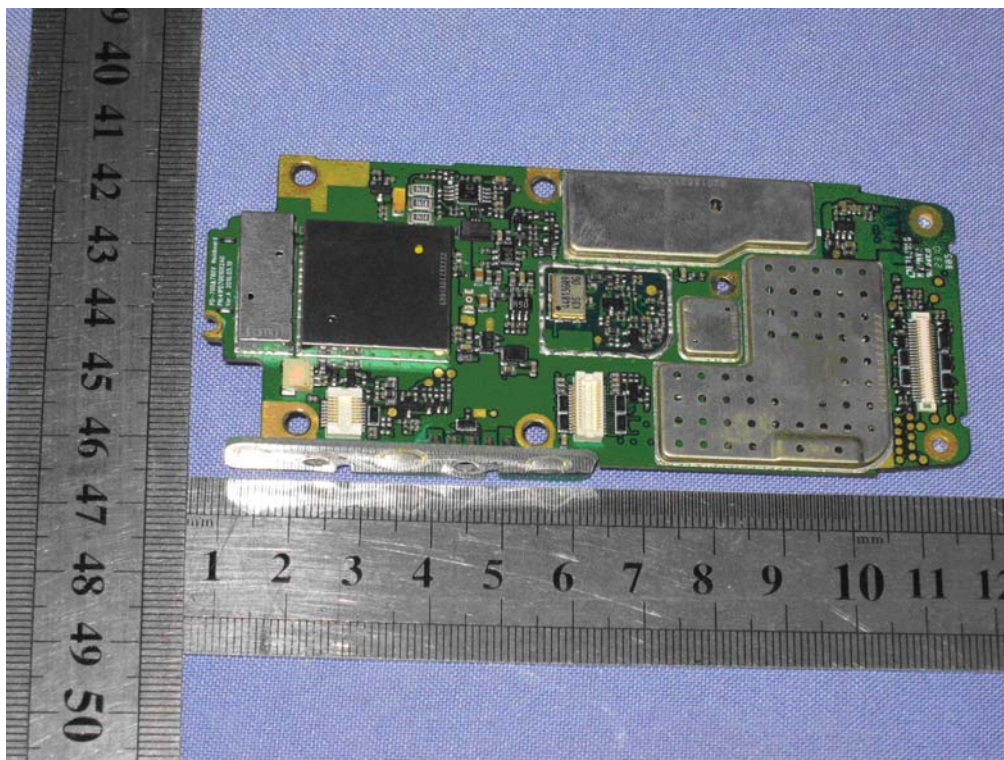
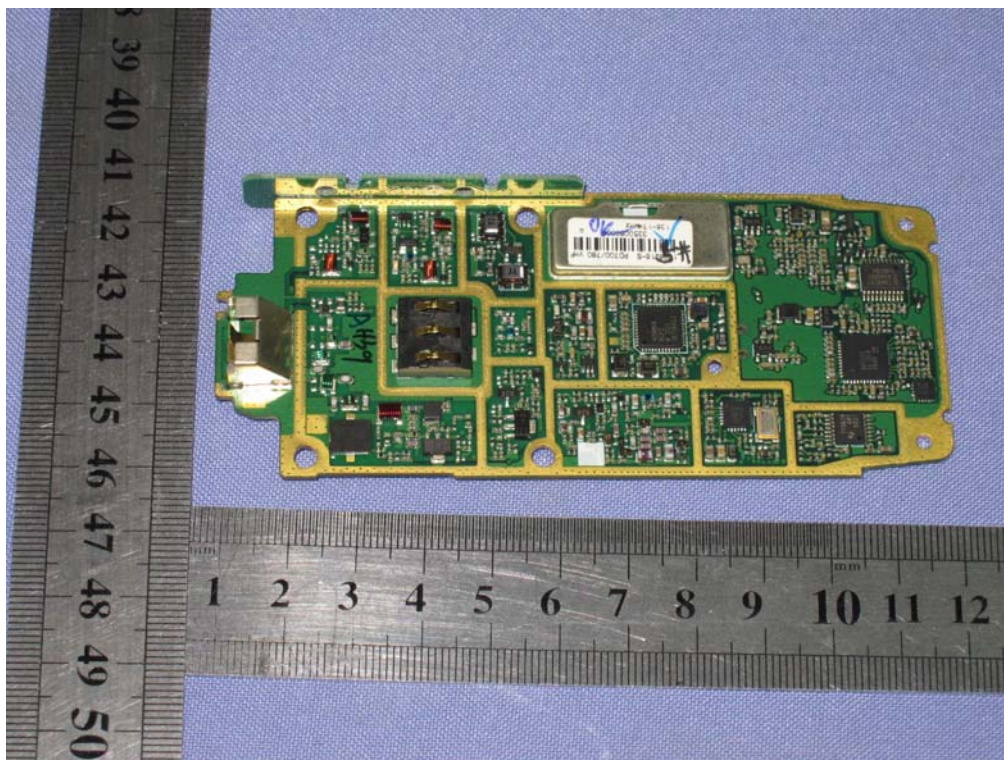


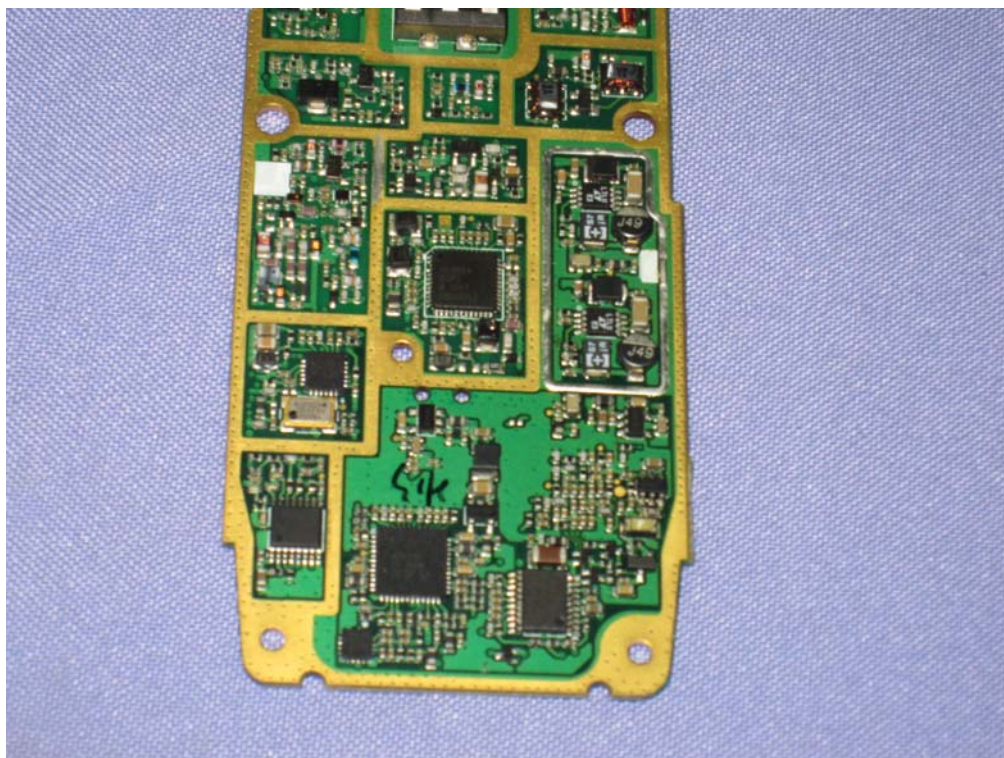
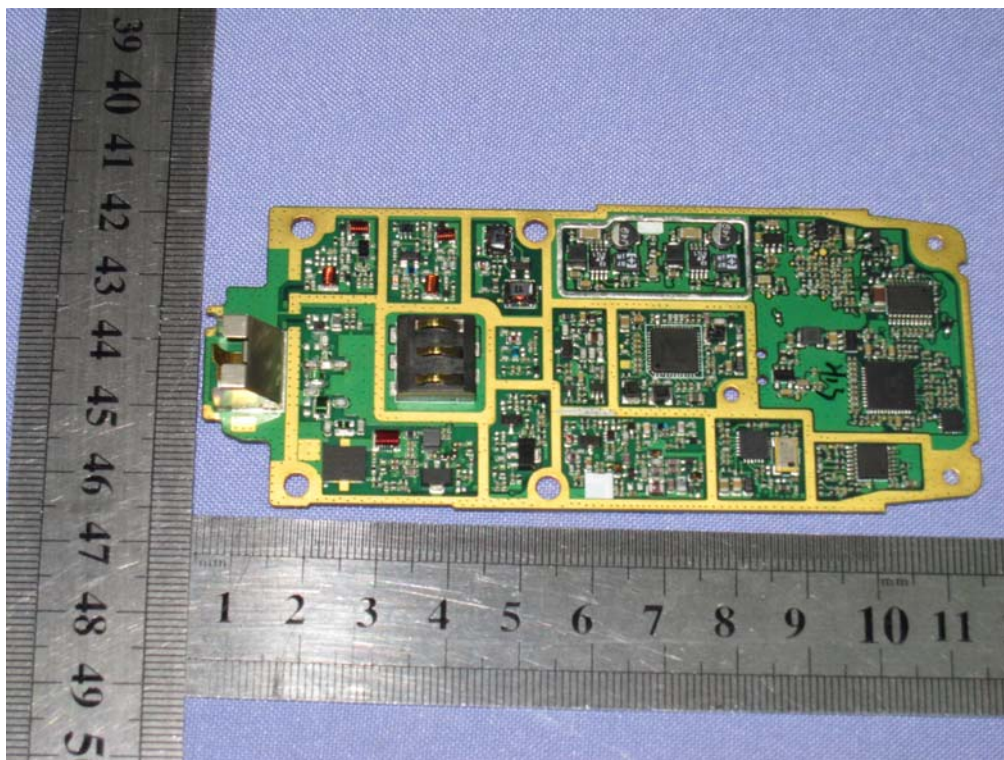


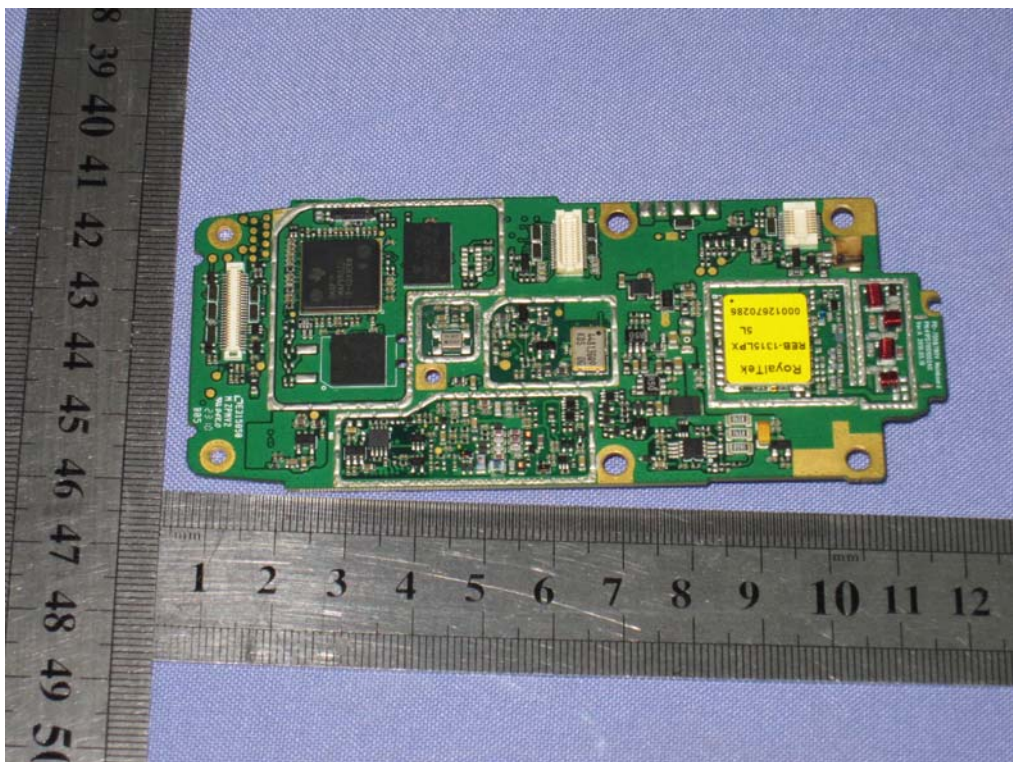
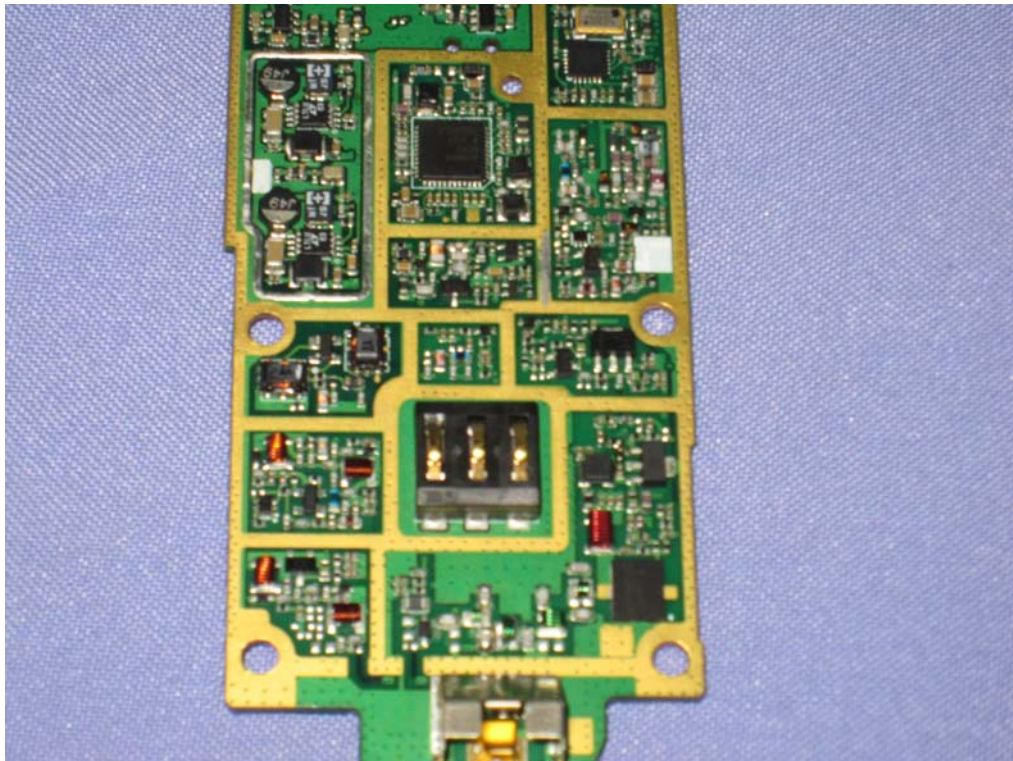
Internal Photos

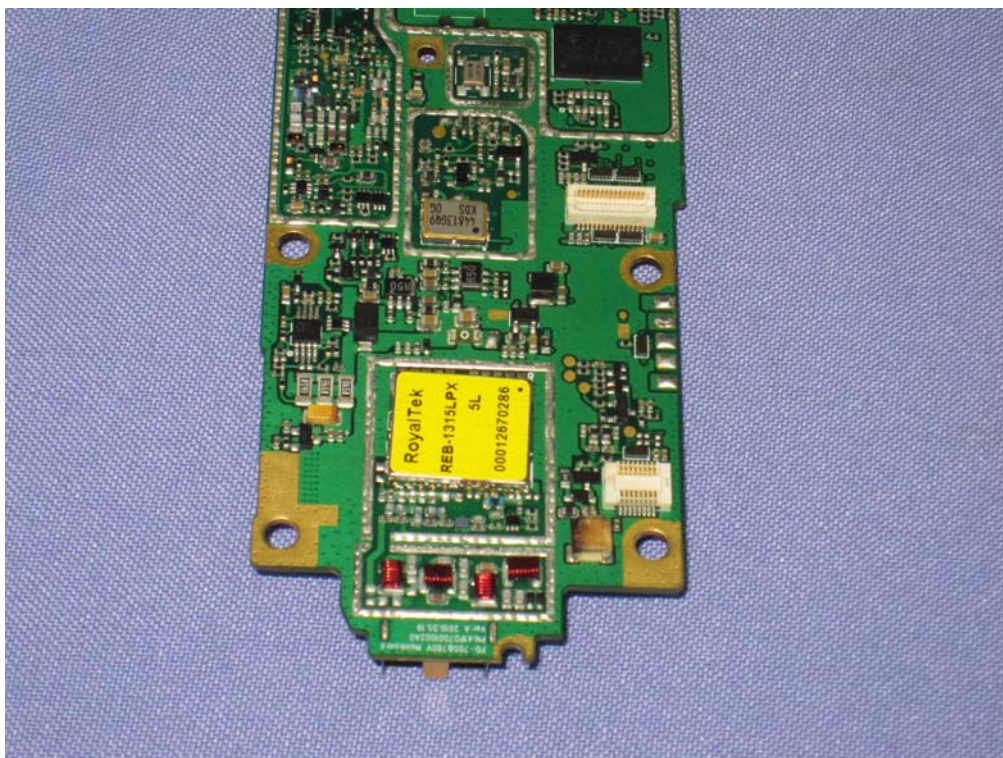
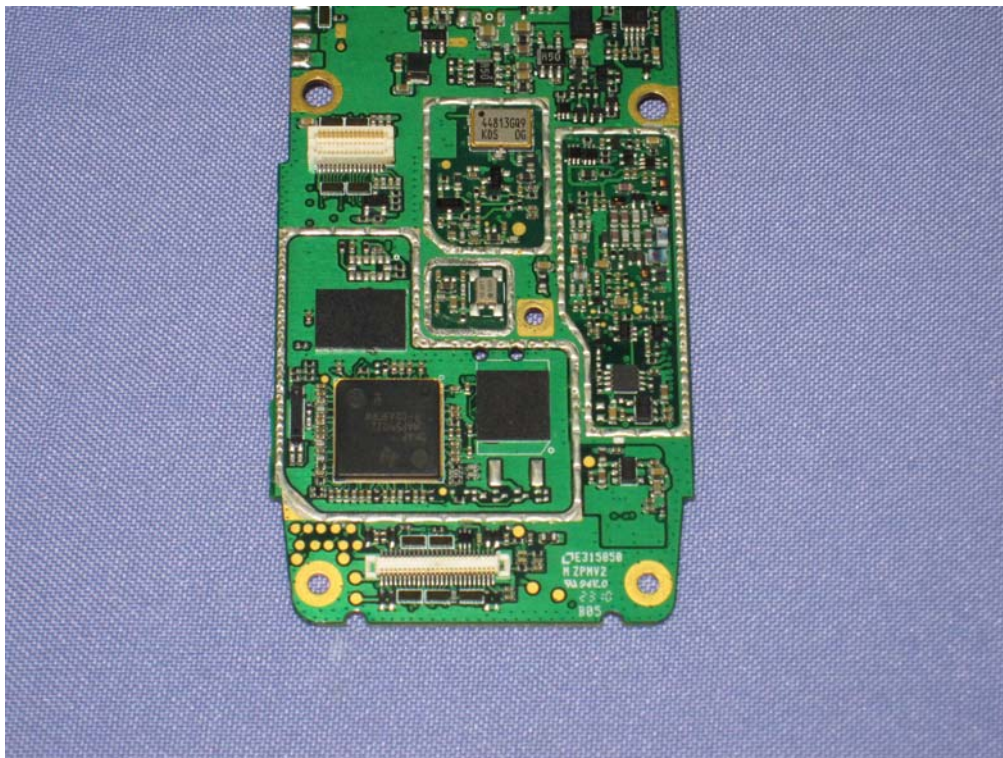












.....End of Report.....