TEST REPORT

Report Reference No. ..... :	**TRE15010147** **R/C…….: 57434**
FCC ID ..... :	**P6NDH-9800U**
Applicant's name ..... :	**Shenzhen HQT Science&Technology Co., Ltd.**
Address.....:	5/F, East of Building M-8, Central Zone, Hi-tech Industrial Park, Nanshan District, Shenzhen,China
Manufacturer.....:	**Shenzhen HQT Science&Technology Co., Ltd.**
Address.....:	5/F, East of Building M-8, Central Zone, Hi-tech Industrial Park, Nanshan District, Shenzhen,China
Test item description ..... :	**Digital portable Radio**
Trade Mark .....:	HQT
Model/Type reference.....:	DH-9800
Listed Model(s) .....:	/
Standard ..... :	**FCC Part 90/FCC Part 2/ FCC Part 15B**
Date of receipt of test sample……..:	Jan 26, 2015
Date of testing……:	Jan 27, 2015- Jan 30, 2015
Date of issue……...:	Jan 30, 2015
Result..... ……...:	**PASS**

Compiled by (position+printed name+signature)..:	File administrators Shayne Zhu	Shayne Zhu
Supervised by (position+printed name+signature)..:	Project Engineer Cary Luo	Cary Luo
Approved by (position+printed name+signature)..:	RF Manager Hans Hu	Hans Hu

Testing Laboratory Name ..... :	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address.....:	Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

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The test report merely corresponds to the test sample.
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1. TEST STANDARDS AND TEST DESCRIPTION

1.1. Test Standards

The tests were performed according to following standards:
FCC Rules Part 90 :2014 Private land mobile radio services.
TIA/EIA 603 D:June 2010 Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
FCC Part 15 Subpart B:2014 Unintentional Radiators
FCC Part 2: 2014 Frequency allocations and radio treaty matters, general rules and regulations.
KDB579009 D01 v03r01: Questions and Answers on Re-farming Part 90 frequencies
KDB 579009 D02 v01r02 :Transition Summary Table

1.2. Test Description

Test specification clause	Test case	Verdict
FCC Part 15.107	Conducted Emission	PASS
FCC Part 90.205	Maximum Transmitter Power	PASS
FCC Part 90.209	Occupied Bandwidth	PASS
FCC Part 90.210	Emission Mask	PASS
FCC Part 90.213	Frequency Stability	PASS
FCC Part 90.214	Transmitter Frequency Behavior	PASS
FCC Part 90.210	Transmitter Radiated Spurious Emssion	PASS
FCC Part 90.210	Spurious Emssion On Antenna Port	PASS
FCC Part 15.109	Receiver Radiated Spurious Emssion	PASS

Remark: 1.The measurement uncertainty is not included in the test result.

2. SUMMARY

2.1. Client Information

Applicant:	Shenzhen HQT Science&Technology Co., Ltd
Address:	5/F, East of Building M-8, Central Zone, Hi-tech Industrial Park, Nanshan District, Shenzhen,China
Manufacturer:	Shenzhen HQT Science&Technology Co., Ltd
Address:	5/F, East of Building M-8, Central Zone, Hi-tech Industrial Park, Nanshan District, Shenzhen,China

2.2. Product Description

Name of EUT:	Digital portable Radio	
Trade mark:	HQT	
Model/Type reference:	DH-9800	
Listed mode(s):	/	
Power supply:	DC 7.40V from battery	
Battery information:	Model:BL2002 Norm:DC 7.4V 2000mAh/14.8Wh	
Charger information:	Model:CL1000 Input:DC 12V, 1000mA Output: DC 1000mA	
Adapter information:	Model:NLB100120W1A Input:AC 100-240V~50/60Hz 0.4A Max Output:DC 12V,1A	
Operation Frequency Range:	From 400 MHz to 470 MHz	
Rated Output Power:	4 Watts(36.02dBm)/1Watts(30.00dBm)	
	Digital Voice/Digital Data:	4FSK
Channel Separation:	Digital Voice/Digital Data:	12.5kHz
Emission Designator:	Digital Voice:	7K70FXW
	Digital Data:	7K70FXD
Support data rate	9.6kbps	
Antenna Type	External	
Maximum Transmitter Power	Digital	4.6W for 12.5 kHz Channel Separation

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

Test frequency list

Modulation Type	Channel Separation	Test Frequency (MHz)
Digital/4FSK	12.5KHz	400.0125
		435.0125
		469.9875

Note:

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

2.3. 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.

EUT operation mode no.	Description of operation mode	Additional information
Op 1	4FSK+BW12.5kHz+TX	The equipment is set with 4FSK modulation and 12.5kHz bandwidth at maximum rated power for transmitter,powered by DC 7.40V
Op 2	4FSK+BW12.5kHz+TX	The equipment is set with 4FSK modulation and 12.5kHz bandwidth at minimum rated power for transmitter,powered by DC 7.40V
Op 3	4FSK+BW12.5kHz+RX	The equipment is set with 4FSK modulation and 12.5kHz bandwidth receiver or standby,powered by AC 120V/60Hz from adapter
Op 4	GPS	Gps Receiver Mode,powered by AC 120V/60Hz from adapter

2.4. EUT configuration

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

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	3.00
		Shield :	Unshielded
		Detachable :	Undetachable
○	Multimeter	Manufacturer :	/
		Model No. :	/

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

This submittal(s) (test report) is intended for FCC ID: P6NDH-9800U filing to comply with FCC Part 90 rules.

2.6. Modifications

No modifications were implemented to meet testing criteria.

3. Test Environment

3.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd.
Address: Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

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: Feb. 28, 2015. Valid time is until February 27, 2018.

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, 2015.

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 Jul. 01, 2012, valid time is until Jun. 01, 2015.

FCC-Registration No.: 317478

Shenzhen Huatongwei International Inspection Co., Ltd. (Gongming 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 317478, Renewal date July 18, 2014, valid time is until July. 18, 2017.

IC-Registration No.: 5377A

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. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.

IC-Registration No.: 5377B

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. (Gongming EMC Laboratory) has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on September 3, 2014, valid time is until September 3, 2017.

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.

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) 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: Dec. 20, 2012. Valid time is until Dec. 29, 2015.
Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.
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: Dec. 20, 2012. Valid time is until Dec. 19, 2015.
Telecommunication 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.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

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, 2016.

3.3. Environmental conditions

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

Temperature:	15~35°C
lative Humidity:	30~60 %
Air Pressure:	950~1050mba

3.4. 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	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9kHz-40 GHz	1.60 dB	(1)
Conducted Emission 9kHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.65 dB	(1)
Radiated Emissio 1~18GHz	5.16 dB	(1)
Radiated Emissio 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	---------	(1)
Emission Mask	---------	(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.

3.5. Equipments Used during the Test

AC Power Conducted Emission				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Last Cal.**
Artificial Mains	Rohde&Schwarz	ESH2-Z5	100028	2014/11/1
EMI Test Receiver	Rohde&Schwarz	ESCS 30	100038	2014/11/1
Pulse Limiter	Rohde&Schwarz	ESHSZ2	100044	2014/11/1
EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	N/A
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1

DC Power Conducted Emission				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Last Cal.**
Artificial Mains	Rohde&Schwarz	ESH2-Z6	100210	2014/11/1
Artificial Mains	Rohde&Schwarz	ESH2-Z6	100211	2014/11/1
EMI Test Receiver	Rohde&Schwarz	ESCS 30	100038	2014/11/1
Pulse Limiter	Rohde&Schwarz	ESHSZ2	100044	2014/11/1
EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	N/A
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1

Frequency Stability				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Last Cal.**
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1
Signal Generator	Rohde&Schwarz	SMT03	100059	2014/11/1
Climate Chamber	ESPEC	EL-10KA	05107008	2014/11/1
Receiver	Rohde&Schwarz	ESI 26	100009	2014/11/1

Transmitter Radiated Spurious Emssion				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Last Cal.**
Ultra-Broadband Antenna	Rohde&Schwarz	HL562	100015	2014/11/1
EMI Test Receiver	Rohde&Schwarz	ESI 26	100009	2014/11/1
RF Test Panel	Rohde&Schwarz	TS / RSP	335015/ 0017	N/A
HORN ANTENNA	Rohde&Schwarz	HF906	100039	2014/11/1
Turntable	ETS	2088	2149	N/A
Antenna Mast	ETS	2075	2346	N/A
EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	N/A
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1
Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2014/11/1
Ultra-Broadband Antenna	ShwarzBeck	VULB9163	539	2014/11/1
HORN ANTENNA	ShwarzBeck	9120D	1012	2014/11/1
HORN ANTENNA	ShwarzBeck	9120D	1011	2014/11/1
TURNTABLE	MATURO	TT2.0	----	N/A
ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A

Maximum Transmitter Power & Spurious Emssion On Antenna Port & Occupied Bandwidth & Emission Mask				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Last Cal.**
Receiver	Rohde&Schwarz	ESI 26	100009	2014/11/1
Attenuator	R&S	ESH3-22	100449	2014/11/1
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1
High-Pass Filter	Anritsu	MP526B	6220875256	2014/11/1
High-Pass Filter	Anritsu	MP526D	6220878392	2014/11/1
Spectrum Analzyer	Aglient	E4407B	MY44210775	2014/11/1
Spectrum Analzyer	Rohde&Schwarz	FSP40	1164.4391.40	2014/11/1
SPECTRUM ANALYZER	Agilent	E4407B	MY44210775	2014/11/1

Transient Frequency Behavior				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Last Cal.**
Signal Generator	Rohde&Schwarz	SMT03	100059	2014/11/1
Storage Oscilloscope	Tektronix	TDS3054B	B033027	2014/11/1
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	2014/11/1

The calibration interval was one year.

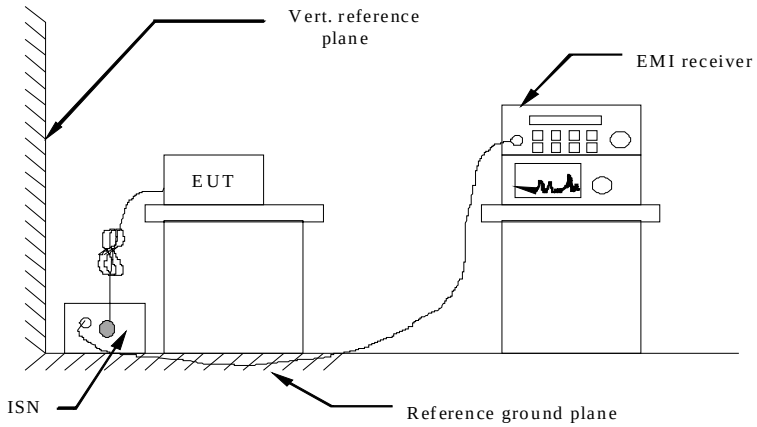
4. TEST CONDITIONS AND RESULTS

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 AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 If a EUT received DC 7.40V power through a Impedance Stabilization Network (ISN) which supplied power source and was grounded to the ground plane.
6 All support equipments received AC power from a second LISN, if any.
7 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.
8 Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
9 During the above scans, the emissions were maximized by cable manipulation.

Conducted Power Line Emission Limit

For intentional device, according to § 15.107(a) for AC Power Conducted Emission Limits is as following:

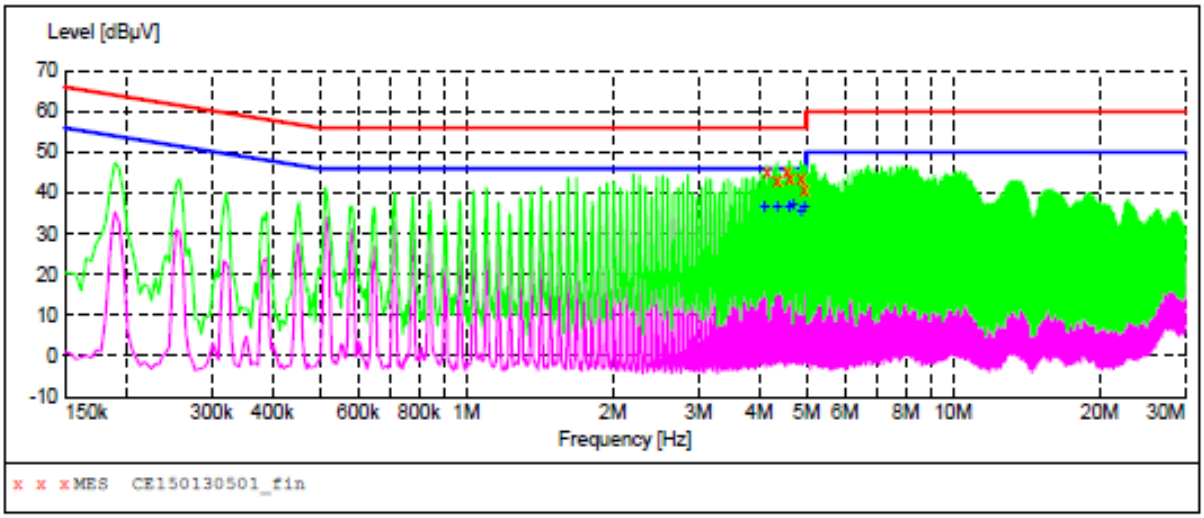
Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

Remark: we tested all Op 3 to Op 4, recorded worst case at Op 1(test Frequency: 435.0125MHz), and Op 4.

Test mode:	Op 3: 435.0125MHz	Polarization	L1



MEASUREMENT RESULT: "CE150130501_fin"

1/30/2015 8:50AM

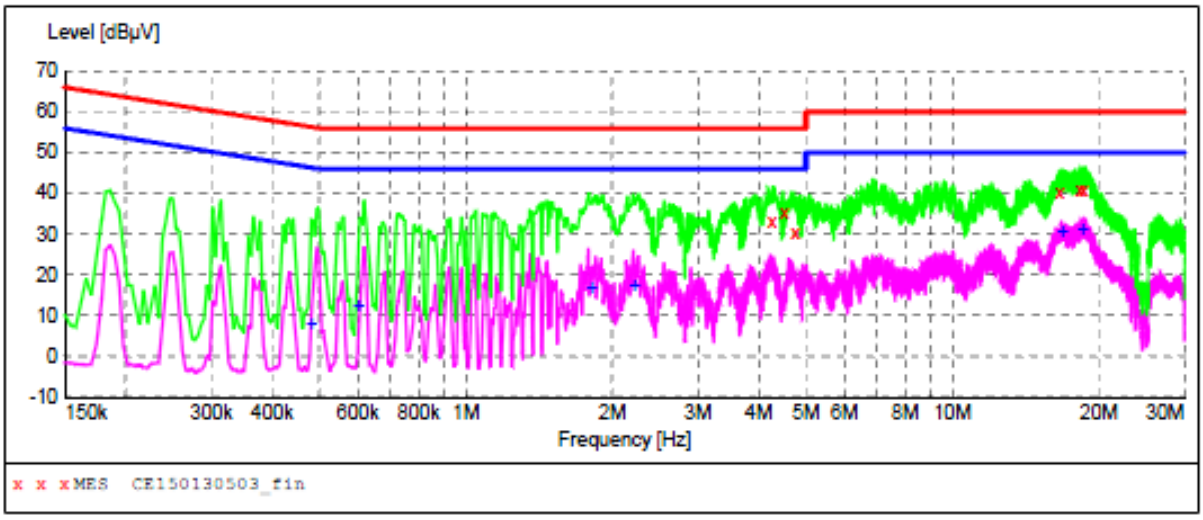
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
4.166000	45.00	10.3	56	11.0	QP	L1	GND
4.362000	43.10	10.4	56	12.9	QP	L1	GND
4.558000	45.50	10.4	56	10.5	QP	L1	GND
4.622000	43.50	10.4	56	12.5	QP	L1	GND
4.882000	43.50	10.4	56	12.5	QP	L1	GND
4.946000	40.90	10.4	56	15.1	QP	L1	GND

MEASUREMENT RESULT: "CE150130501_fin2"

1/30/2015 8:50AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
4.102000	37.00	10.3	46	9.0	AV	L1	GND
4.362000	37.10	10.4	46	8.9	AV	L1	GND
4.622000	36.90	10.4	46	9.1	AV	L1	GND
4.690000	37.60	10.4	46	8.4	AV	L1	GND
4.882000	35.70	10.4	46	10.3	AV	L1	GND
4.950000	37.00	10.4	46	9.0	AV	L1	GND

Test mode:	Op 3:435.0125MHz	Polarization	N



MEASUREMENT RESULT: "CE150130503_fin"

1/30/2015 8:56AM

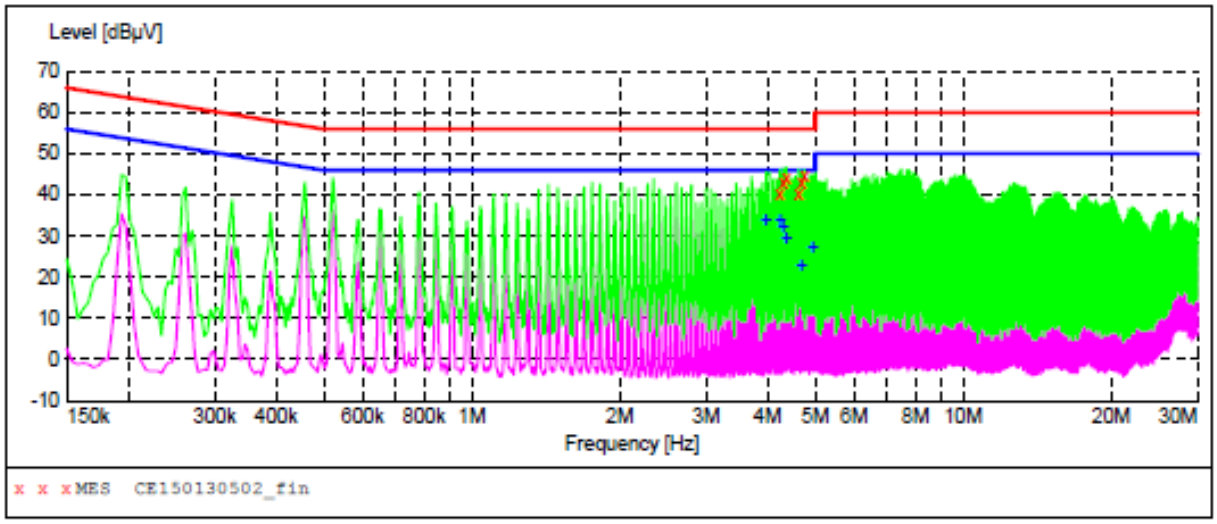
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
4.270000	33.20	10.3	56	22.8	QP	N	GND
4.514000	35.30	10.4	56	20.7	QP	N	GND
4.754000	30.60	10.4	56	25.4	QP	N	GND
16.630000	40.10	10.9	60	19.9	QP	N	GND
18.282000	40.70	10.9	60	19.3	QP	N	GND
18.626000	40.70	10.9	60	19.3	QP	N	GND

MEASUREMENT RESULT: "CE150130503_fin2"

1/30/2015 8:56AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.482000	8.40	10.2	46	37.9	AV	N	GND
0.602000	12.60	10.2	46	33.4	AV	N	GND
1.810000	17.00	10.2	46	29.0	AV	N	GND
2.222000	17.40	10.2	46	28.6	AV	N	GND
16.794000	30.90	10.9	50	19.1	AV	N	GND
18.466000	31.30	10.9	50	18.7	AV	N	GND

Test mode:	Op 4	Polarization	L1



MEASUREMENT RESULT: "CE150130502_fin"

1/30/2015 8:53AM

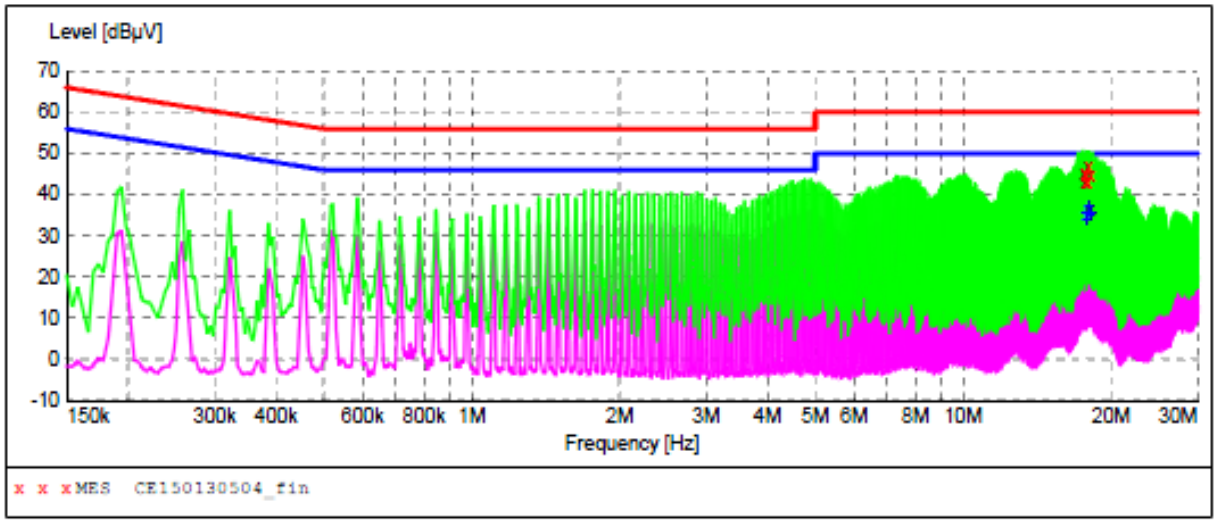
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
4.238000	40.20	10.3	56	15.8	QP	L1	GND
4.306000	43.10	10.3	56	12.9	QP	L1	GND
4.370000	44.40	10.4	56	11.6	QP	L1	GND
4.630000	40.40	10.4	56	15.6	QP	L1	GND
4.698000	43.20	10.4	56	12.8	QP	L1	GND
4.762000	44.50	10.4	56	11.5	QP	L1	GND

MEASUREMENT RESULT: "CE150130502_fin2"

1/30/2015 8:53AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
3.978000	34.10	10.3	46	11.9	AV	L1	GND
4.242000	34.10	10.3	46	11.9	AV	L1	GND
4.306000	32.30	10.3	46	13.7	AV	L1	GND
4.370000	30.00	10.4	46	16.0	AV	L1	GND
4.698000	23.10	10.4	46	22.9	AV	L1	GND
4.958000	27.60	10.4	46	18.4	AV	L1	GND

Test mode:	Op 4	Polarization	N



MEASUREMENT RESULT: "CE150130504_fin"

1/30/2015 8:59AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
17.638000	45.50	10.9	60	14.5	QP	N	GND
17.698000	42.80	10.9	60	17.2	QP	N	GND
17.702000	44.70	10.9	60	15.3	QP	N	GND
17.890000	42.80	10.9	60	17.2	QP	N	GND
17.966000	47.00	10.9	60	13.0	QP	N	GND
18.158000	44.50	10.9	60	15.5	QP	N	GND

MEASUREMENT RESULT: "CE150130504_fin2"

1/30/2015 8:59AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
17.774000	35.60	10.9	50	14.4	AV	N	GND
17.838000	34.40	10.9	50	15.6	AV	N	GND
18.038000	37.70	10.9	50	12.3	AV	N	GND
18.102000	35.40	10.9	50	14.6	AV	N	GND
18.234000	35.70	10.9	50	14.3	AV	N	GND

4.2. Maximum Transmitter Power

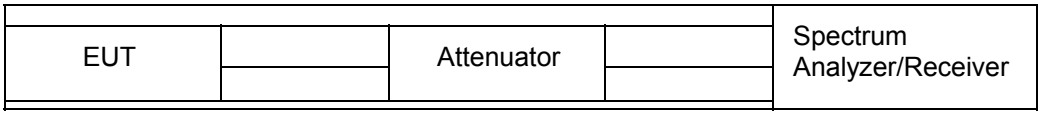
TEST APPLICABLE

Per FCC Part 2.1046 and Part 90.205: Maximum ERP is dependent upon the station's antenna HAAT and required service area.
Per RSS-119 Section 5.4 and 5.4.1: The output power shall be within ±1.0 dB of the manufacturer's rated power. Typical transmitter output powers are 110 watts for base and/or fixed stations (paging transmitters excepted), and 30 watts for mobile stations. Higher powers may be certified, but it should be noted that mobile stations are normally only licensed up to 30 watts. See the SRSP relevant to the operating frequency for equipment power limits.

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 FSP40 conducted, external power supply with 7.40 V stabilized supply voltage.

TEST CONFIGURATION



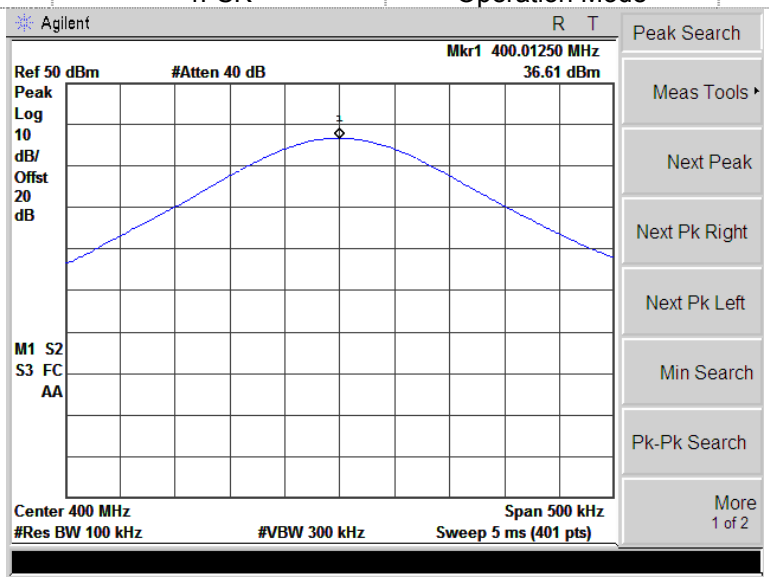
The EUT was directly connected to a RF Communication Test set by a 20 dB attenuator

TEST RESULTS

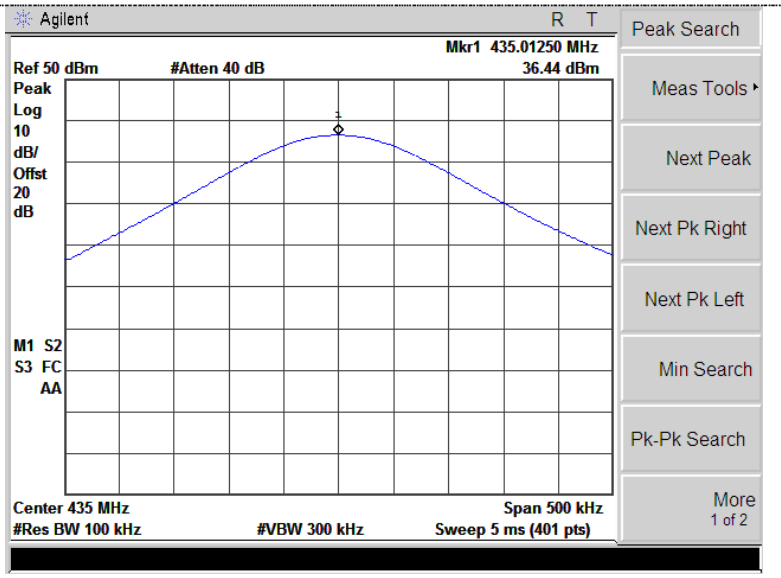
Operation Mode	Test Frequency (MHz)	Measured power (dBm)	Difference (dB)	Limit (dB)	Result
Op 1	400.0125	36.61	0.59	-1 ~ +1	Pass
	435.0125	36.44	0.42		
	469.9875	36.63	0.61		
Op 2	400.0125	29.85	-0.15	-1 ~ +1	Pass
	435.0125	29.42	-0.58		
	469.9875	29.72	-0.28		

Test plot as follows:

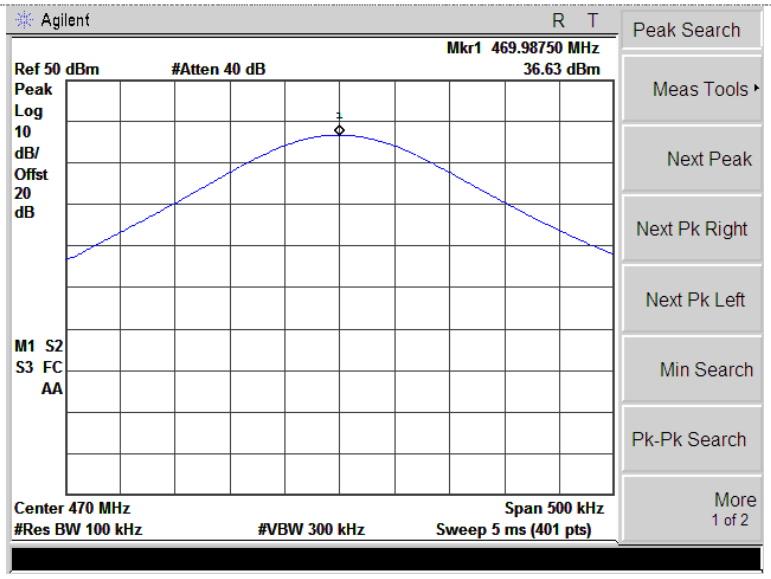
Modulation Type	4FSK	Operation Mode	Op 1



400.0125MHz

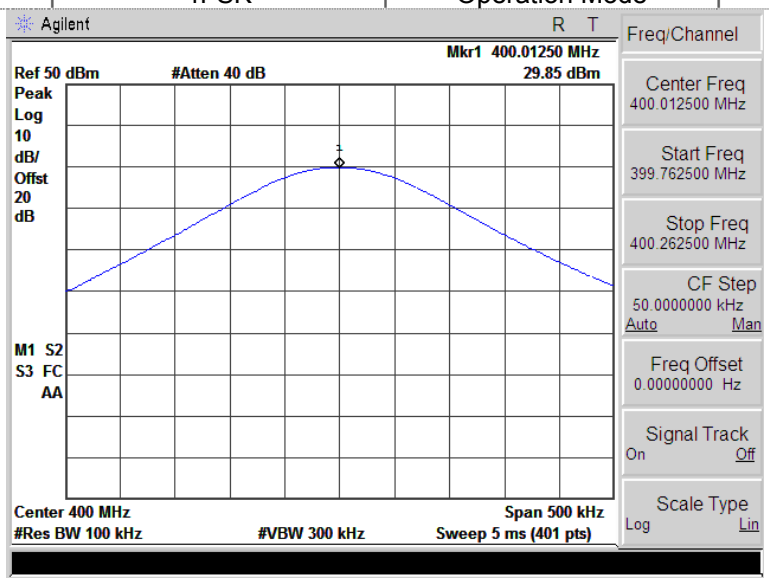


435.0125MHz

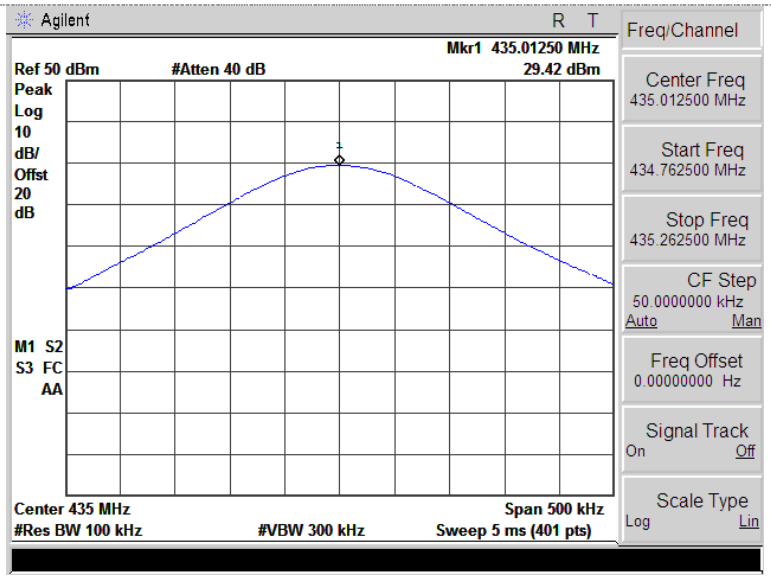


469.9875MHz

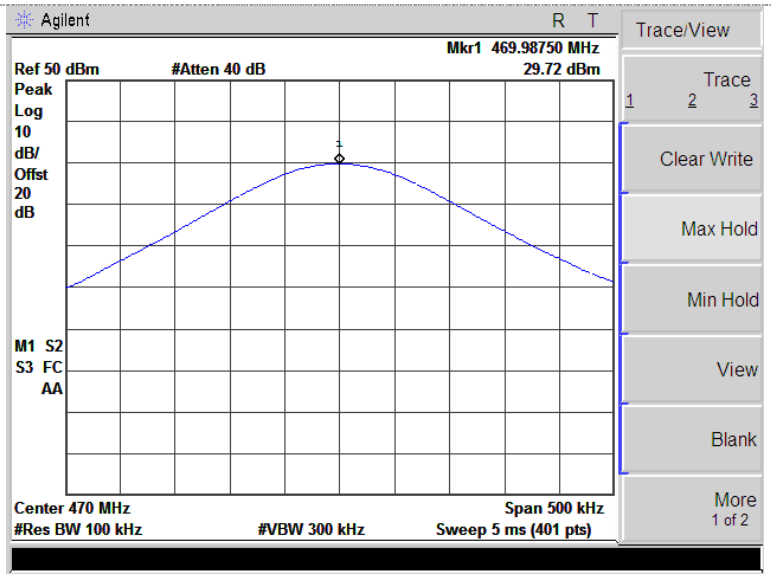
Modulation Type	4FSK	Operation Mode	Op 2



400.0125MHz



435.0125MHz



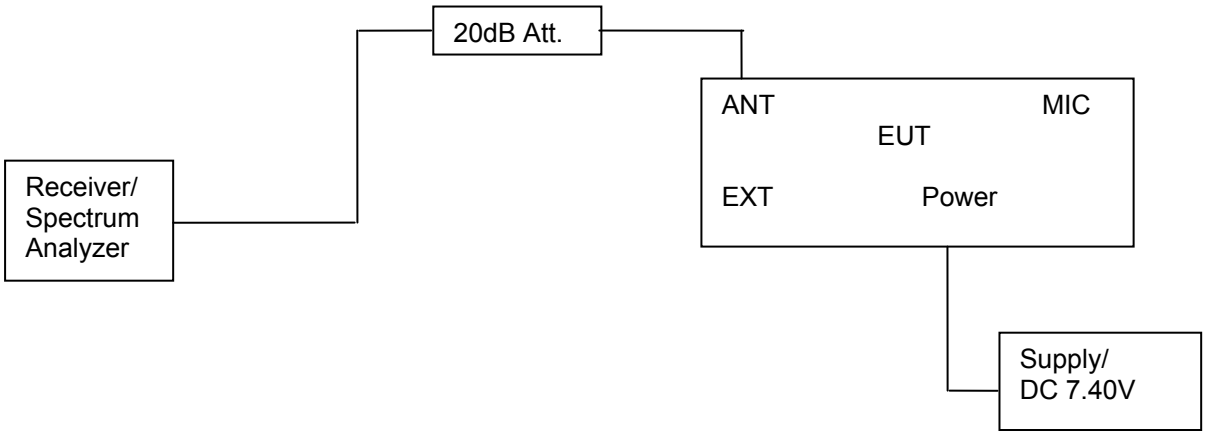
469.9875MHz

4.3. Occupied Bandwidth

TEST APPLICABLE

According to §90.209
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 and minimum power. Then the bandwidth of 99% power can be measured by the spectrum analyzer.

TEST CONFIGURATION



TEST PROCEDURE

1 Set SPA Center Frequency = fundamental frequency, RBW=100Hz, VBW=300Hz,span=50kHz for 12.5kHz channel spacing..
2 Set SPA Max hold. Mark peak, Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.

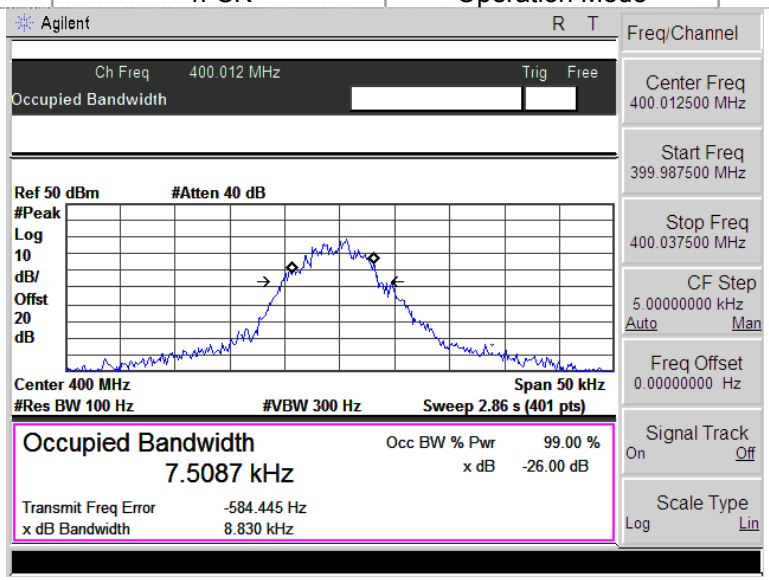
TEST RESULTS

Remark:We tested and recorded Op 1 to Op 2.

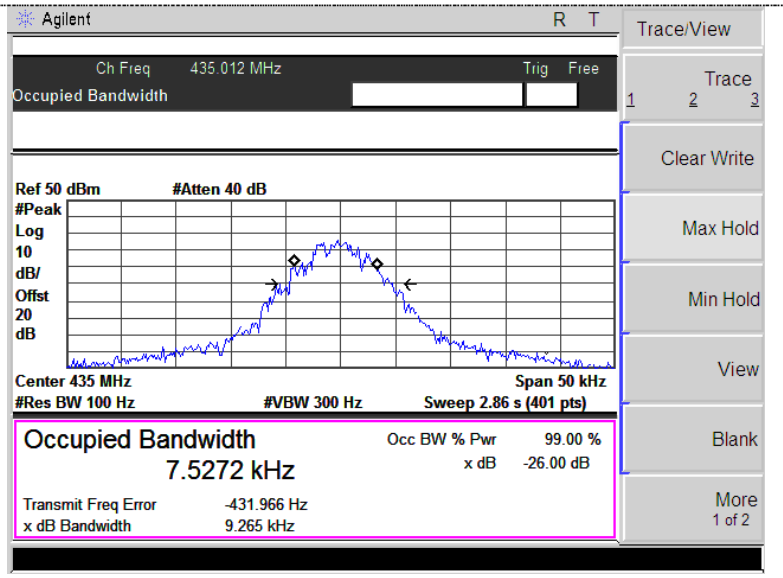
Operation Mode	Test Frequency (MHz)	Occupied Bandwidth (kHz)		Limit (kHz)	Result
		99%	26dB		
Op 1	400.0125	7.51	8.83	≤11.25	Pass
	435.0125	7.53	9.27		
	469.9875	7.54	8.83		
Op 2	400.0125	7.55	9.54	≤11.25	Pass
	435.0125	7.37	9.88		
	469.9875	7.68	9.80		

Test plot as follows:

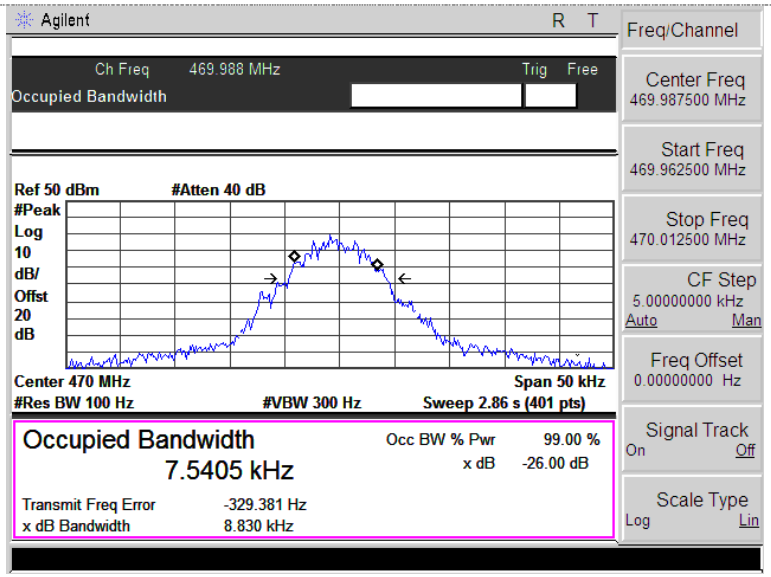
Modulation Type	4FSK	Operation Mode	Op 1



400.0125MHz

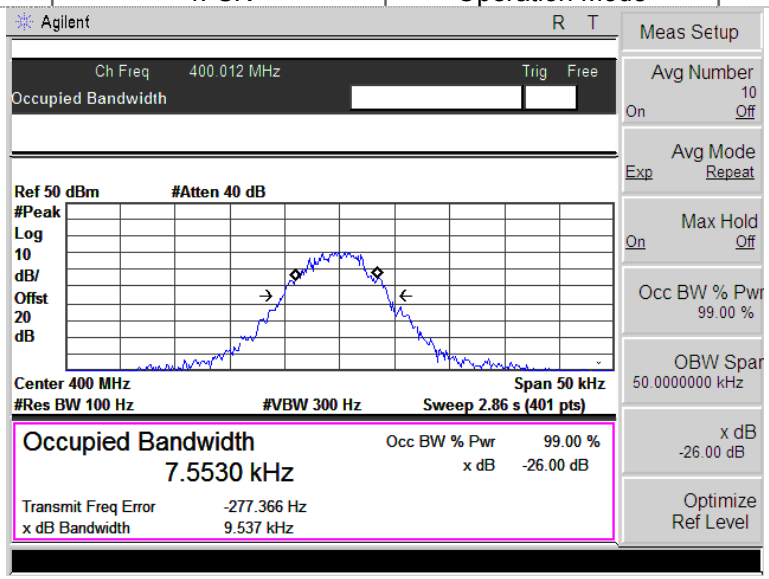


435.0125MHz

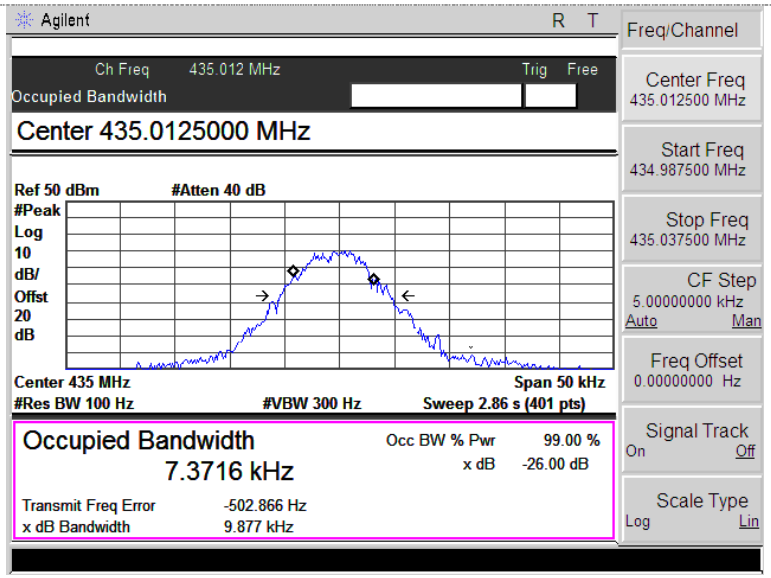


469.9875MHz

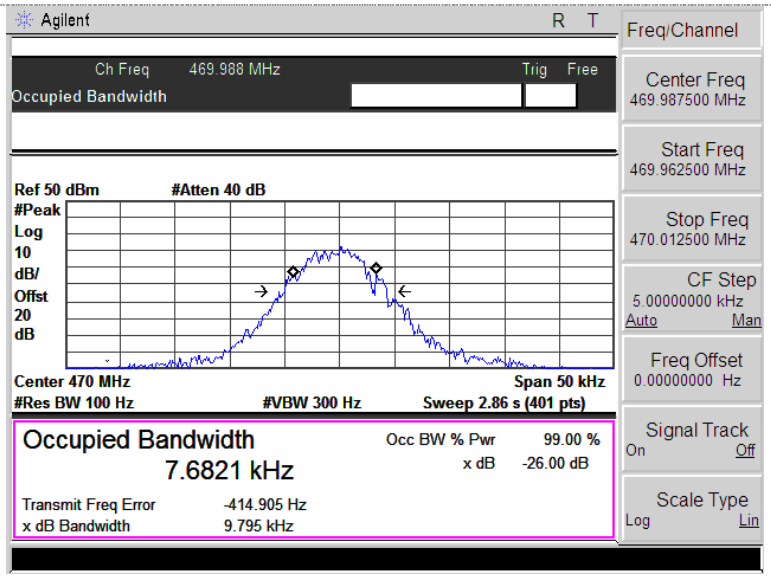
Modulation Type	4FSK	Operation Mode	Op 2



400.0125MHz



435.0125MHz



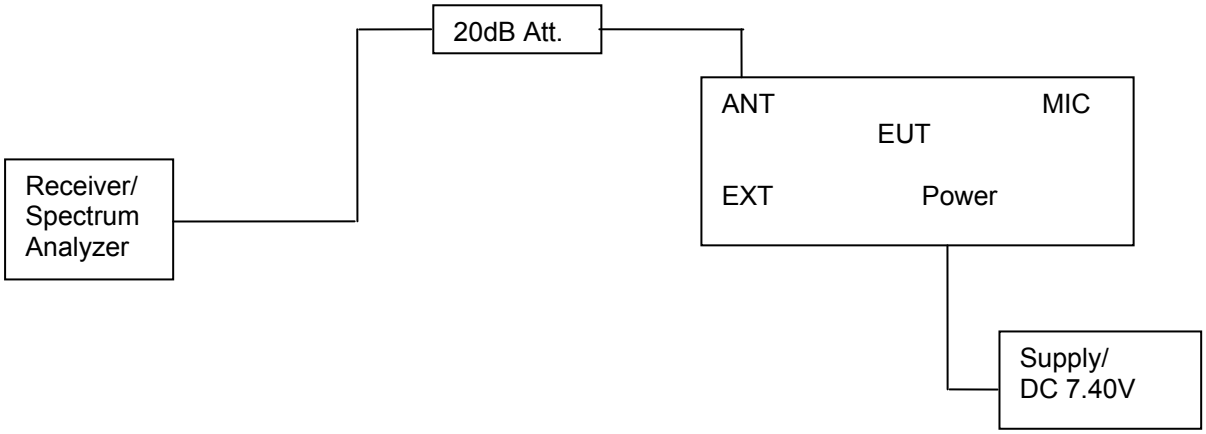
469.9875MHz

4.4. Emission Mask

TEST APPLICABLE

According to §90.210
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 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

Set SPA Center Frequency = fundamental frequency, RBW=100Hz, VBW=300Hz,span=50kHz for 12.5kHz channel spacing.

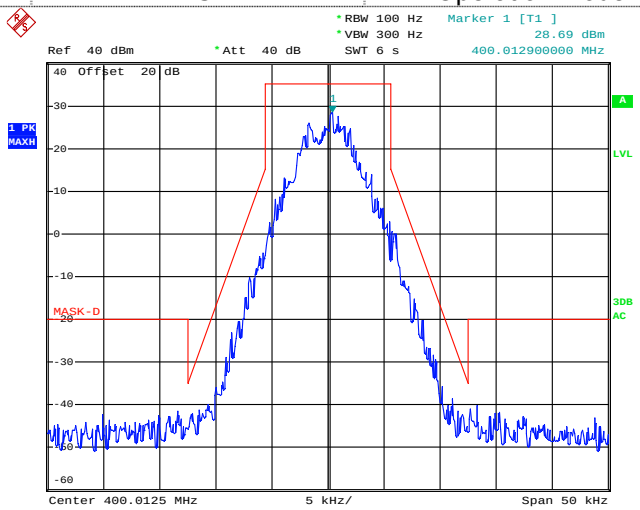
TEST RESULTS

Remark:We tested and recorded Op 1 to Op 2.

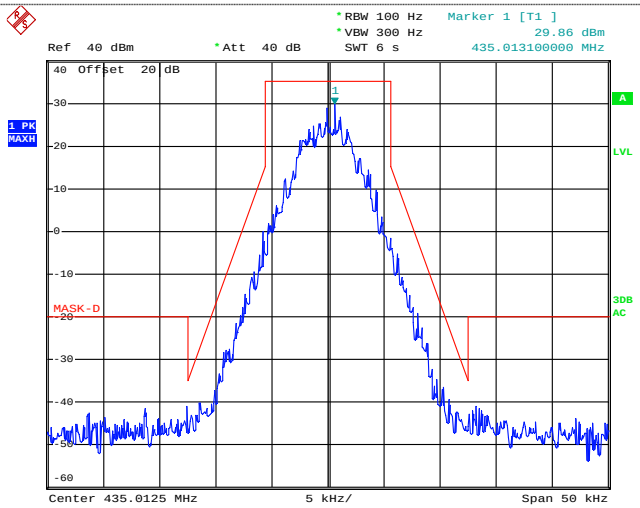
Operation Mode	Test Frequency (MHz)	RBW (Hz)	Applicable Mask	Result
Op 1	400.0125	100.00	D	Pass
	435.0125			
	469.9875			
Op 2	400.0125	100.00	D	Pass
	435.0125			
	469.9875			

Test plot as follows:

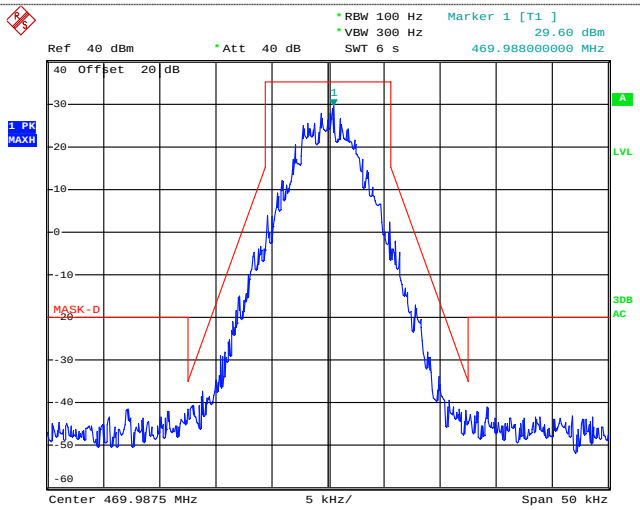
Modulation Type	4FSK	Operation Mode	Op 1



Date: 2.FEB.2015 10:08:46

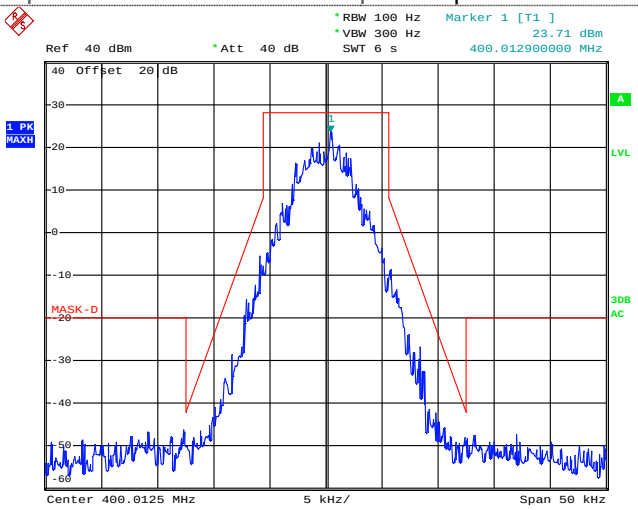


Date: 2.FEB.2015 10:11:34

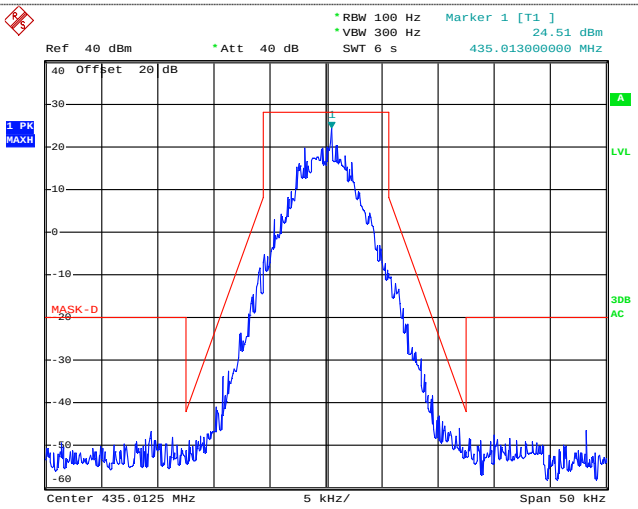


Date: 2.FEB.2015 10:13:02

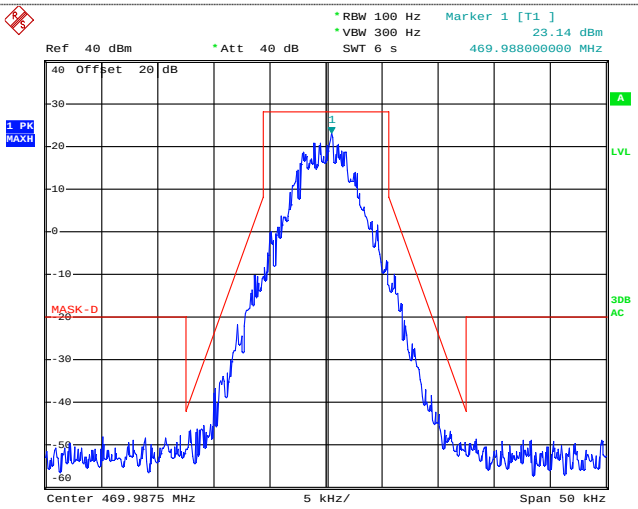
Modulation Type	4FSK	Operation Mode	Op 2



Date: 2.FEB.2015 10:20:59



Date: 2.FEB.2015 10:19:22



Date: 2.FEB.2015 10:17:04

4.5. Frequency Stability

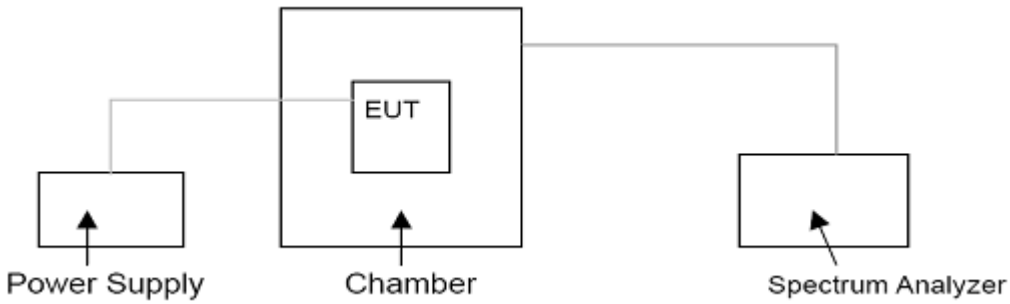
TEST APPLICABLE

1 According to FCC Part 2 Section 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30℃ to +50℃ centigrade.
2 According to FCC Part 2 Section 2.1055 (d) (2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.
3 Vary primary supply voltage from 85 to 115 percent of the nominal value.
4 According to §90.213, the frequency stability limit is 2.5 ppm for 12.5kHz 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

Remark:We tested and recorded.Op 1 to Op 2,recorded.

Op 1						
Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage(V)	Temp(℃)	400.0125MHz	435.0125MHz	469.9875MHz		
7.4	-30	0.34	0.74	0.63	2.5	Pass
	-20	0.34	0.74	0.63		
	-10	0.34	0.73	0.63		
	0	0.34	0.74	0.62		
	10	0.35	0.74	0.63		
	20	0.34	0.74	0.63		
	30	0.34	0.74	0.63		
	40	0.34	0.74	0.63		
	50	0.34	0.74	0.63		
6.29 (85% Rated)	20	0.35	0.73	0.63		
8.51(115%Rated)	20	0.35	0.74	0.65		

Op 2						
Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage(V)	Temp(℃)	400.0125MHz	435.0125MHz	469.9875MHz		
7.4	-30	0.35	0.73	0.72	2.5	Pass
	-20	0.35	0.73	0.72		
	-10	0.35	0.74	0.72		
	0	0.35	0.73	0.72		
	10	0.34	0.73	0.71		
	20	0.35	0.73	0.72		
	30	0.35	0.73	0.72		
	40	0.35	0.73	0.72		
	50	0.35	0.73	0.72		
6.29 (85% Rated)	20	0.36	0.74	0.73		
8.51(115%Rated)	20	0.35	0.73	0.71		

4.6. Transmitter Frequency Behavior

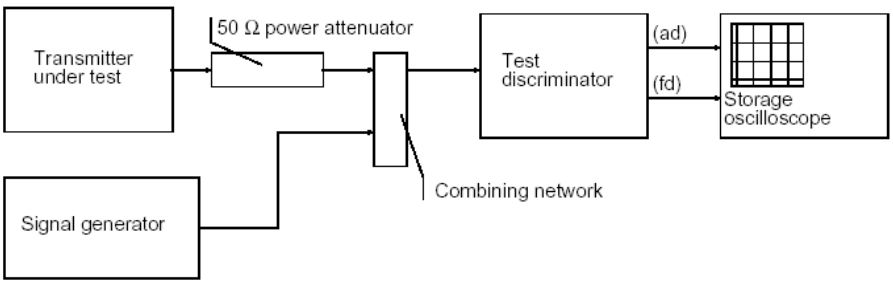
TEST APPLICABLE

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

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

TEST CONFIGURATION



TEST PROCEDURE

According to TIA/EIA-603 2.2.19 requirement.As for the product different from PTT,we use test steps as follows:

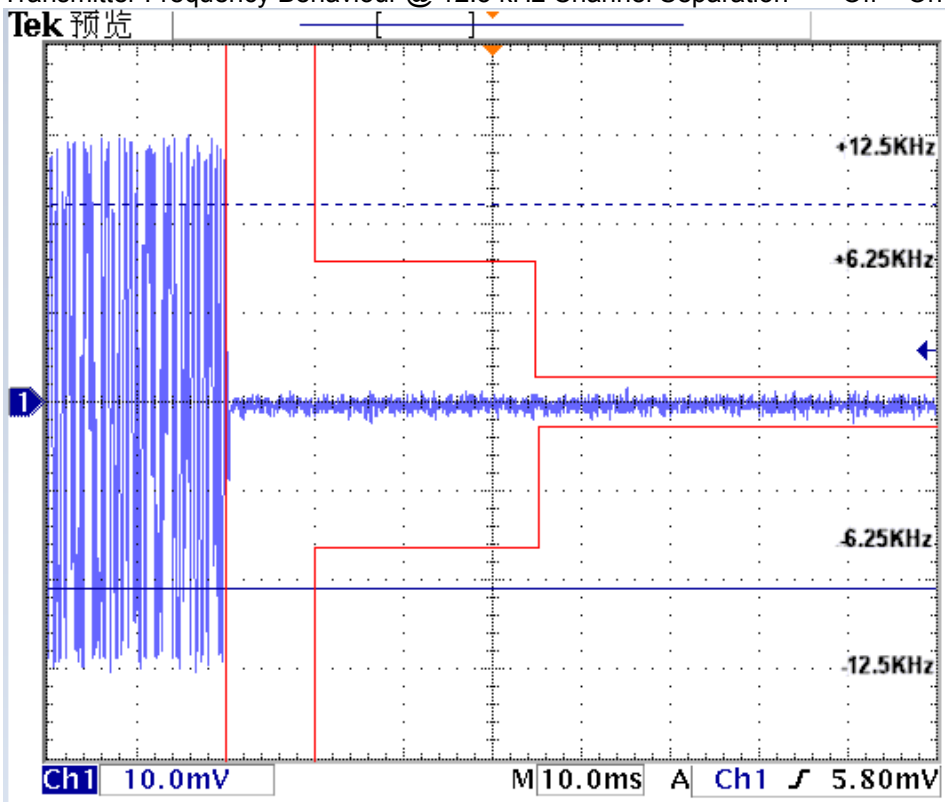
1. Connect DUT into Test discriminator and Storage Oscilloscope and keep DUT stats ON;
2. Set the modulation domain analyzer to trigger on the rising edge of the waveform in order to capture a single-shot turn-on of the transmitter signals;
3. Keep DUT in OFF state and Key the PTT;
4. Observe the stored oscilloscope of modulation domain analyzer.The signal trace shall be maintained within the allowable limits during the periods t_1 and t_2,and shall also remain within limits following t_2;
5. Adjust the modulation domain anzlyzer to trigger on the falling edge of the transmitter waveform in order to capture a single-shot turn-off transmitter of the transmitter signal.
6. Keep the digital portable radio in ON state and Unkey the PTT;
7. Observe the stored oscilloscope of modulation domain analyzer.The signal trace shall be maintained within the allowable limits during the period t_3.

TEST RESULTS

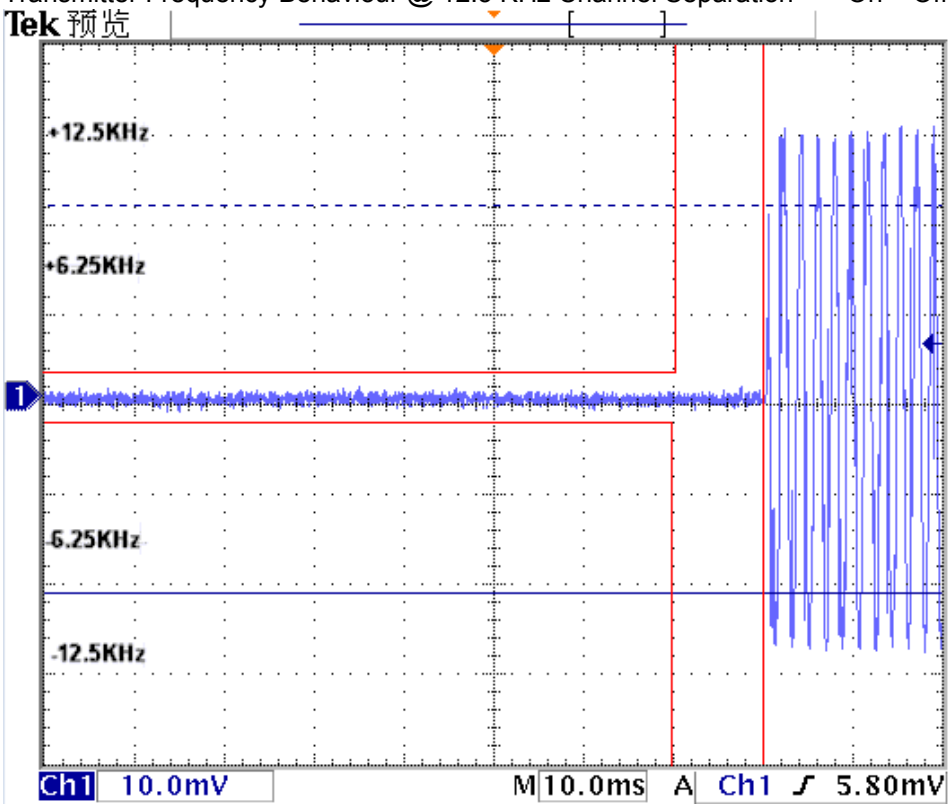
Remark:We tested Op 1 to Op 2,recorded worst case at Op 1 for 435.0125MHz.

Please refer to the following plots.
Modulation Type: 4FSK

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



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



4.7. Spurious Emssion on Antenna Port

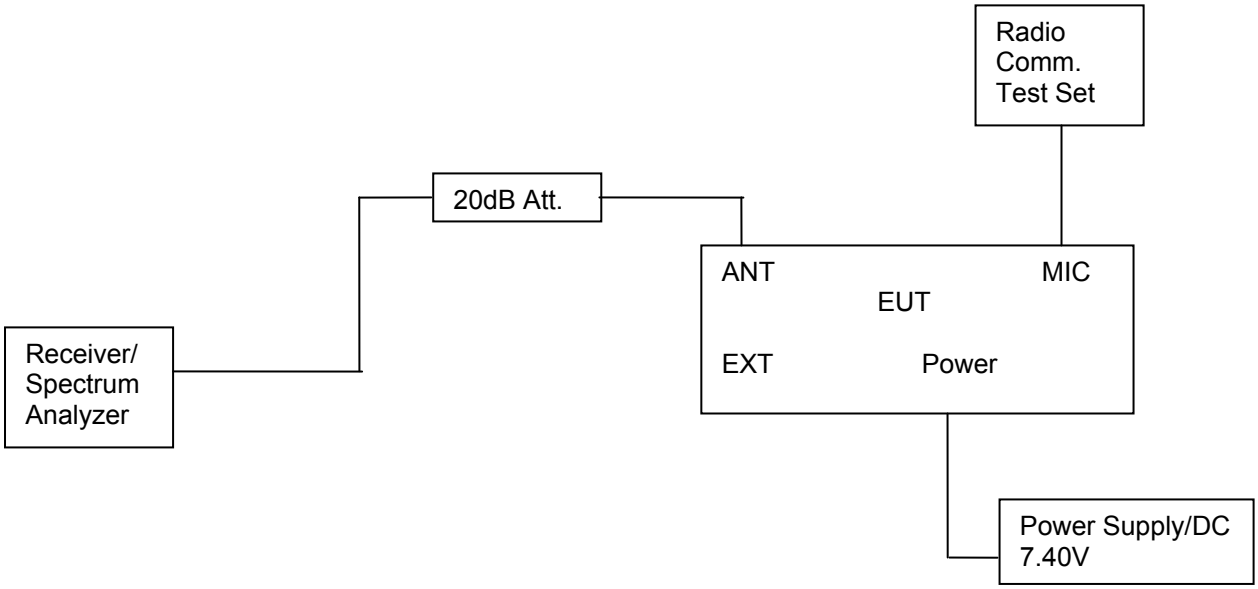
TEST APPLICABLE

The same as Section 4.4

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



LIMIT

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:
High Power: $50 + 10 \log_{10}(\text{Pwatts}) = 50 + 10\log_{10}(4.6) = 56.63\text{dB}$
Low Power: $50 + 10 \log_{10}(\text{Pwatts}) = 50 + 10\log_{10}(0.97) = 49.87\text{dB}$

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 36.63 dBm.
Limit (dBm) $=36.63-50-10\log_{10}(4.6) = -20\text{dBm}$

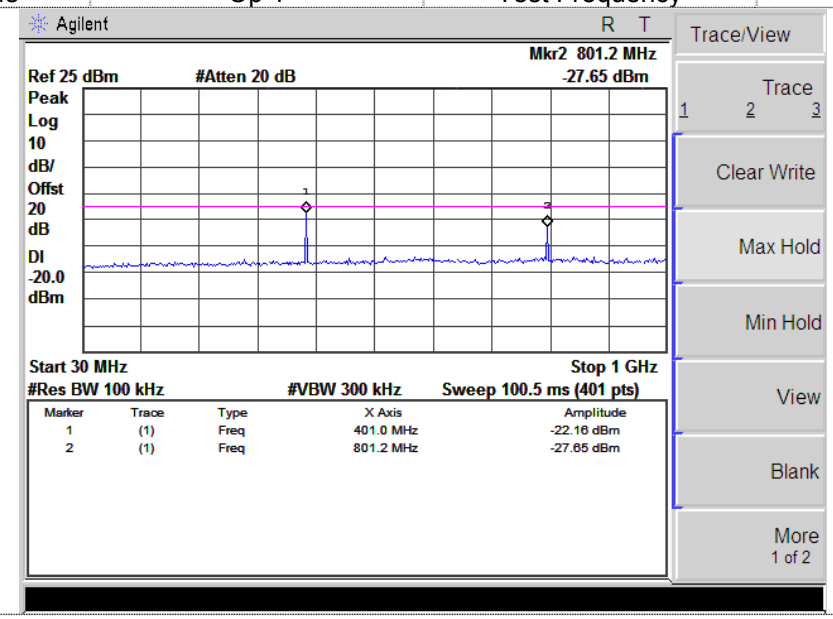
TEST RESULTS

Remark:We tested and recorded Op 1 to Op 2.

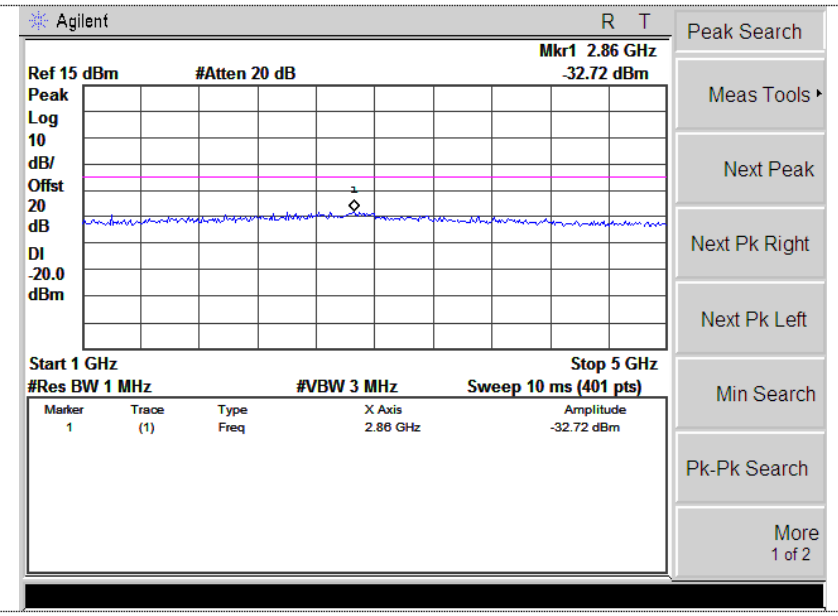
Note:
1. In general, the worse case attenuation requirement shown above was applied.
2. The measurement frequency range from 30 MHz to 5GHz.

Test plot as follows:

Operation Mode	Op 1	Test Frequency	400.0125MHz

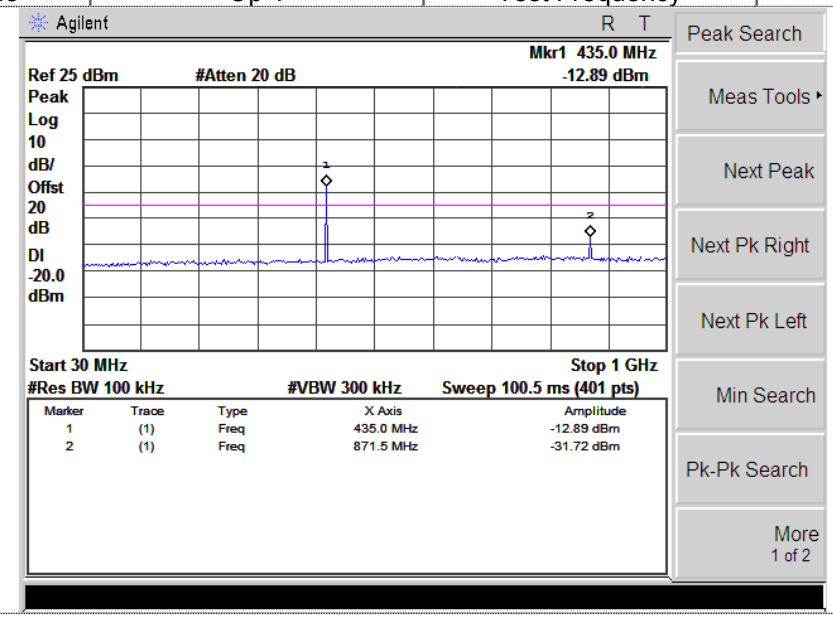


30MHz-1GHz

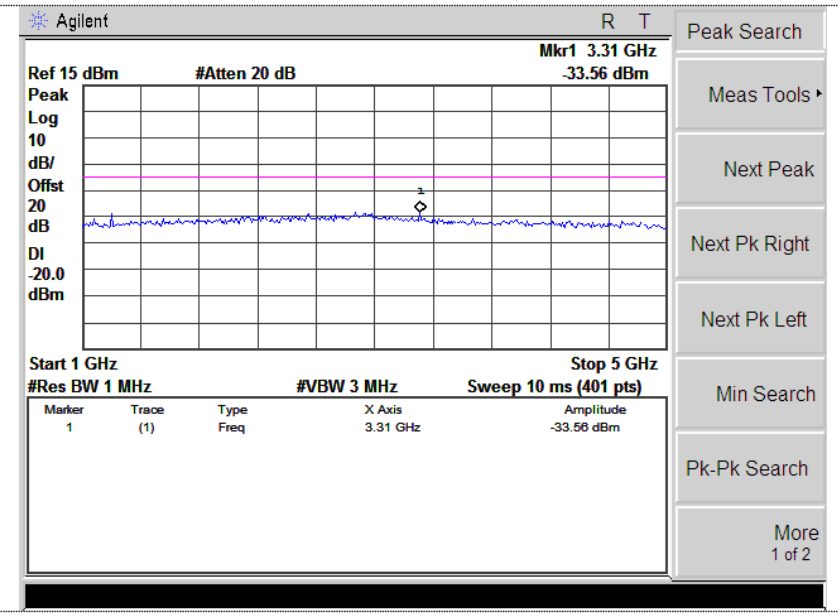


1GHz-5GHz

Operation Mode	Op 1	Test Frequency	435.0125MHz

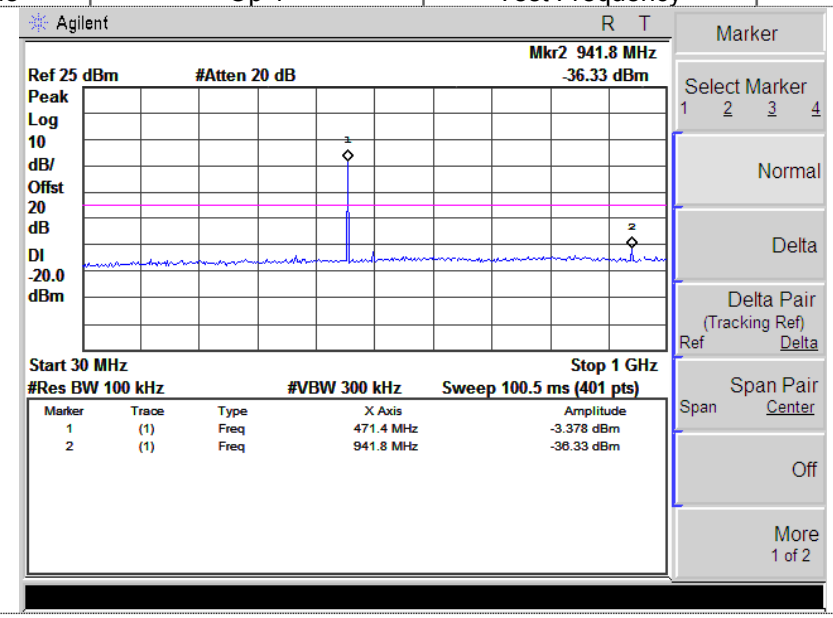


30MHz-1GHz

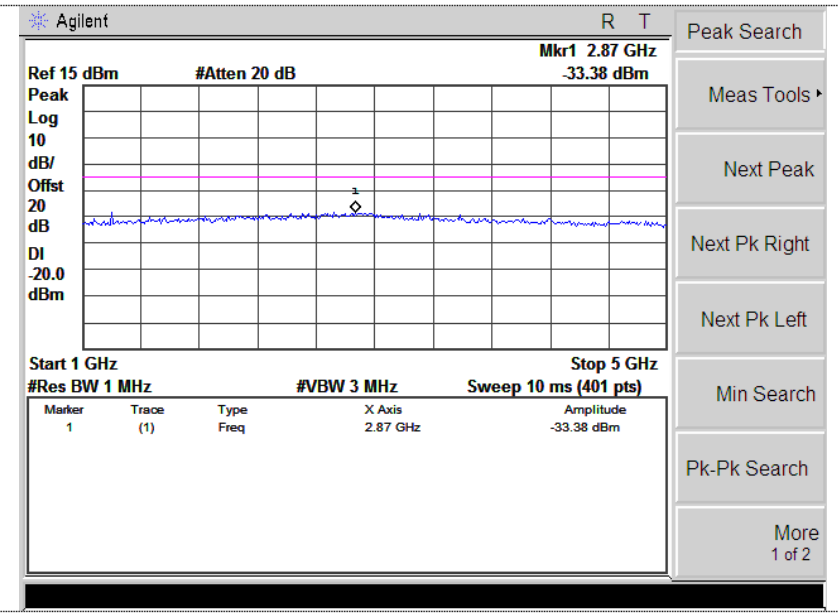


1GHz-5GHz

Operation Mode	Op 1	Test Frequency	469.9875MHz

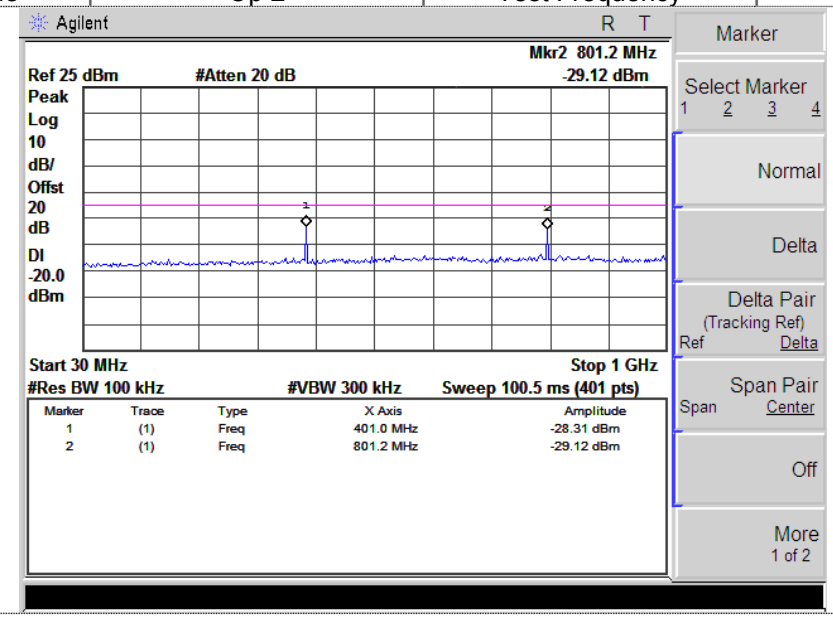


30MHz-1GHz

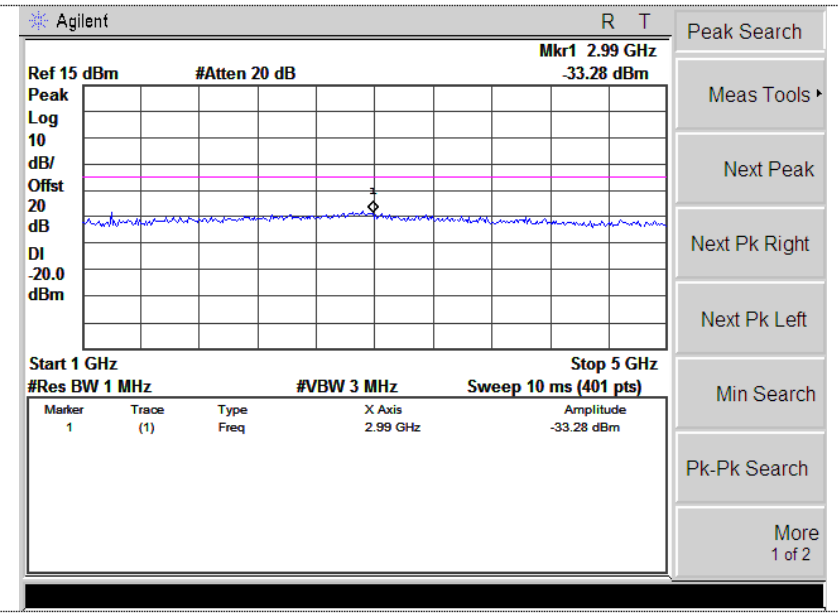


1GHz-5GHz

Operation Mode	Op 2	Test Frequency	400.0125MHz

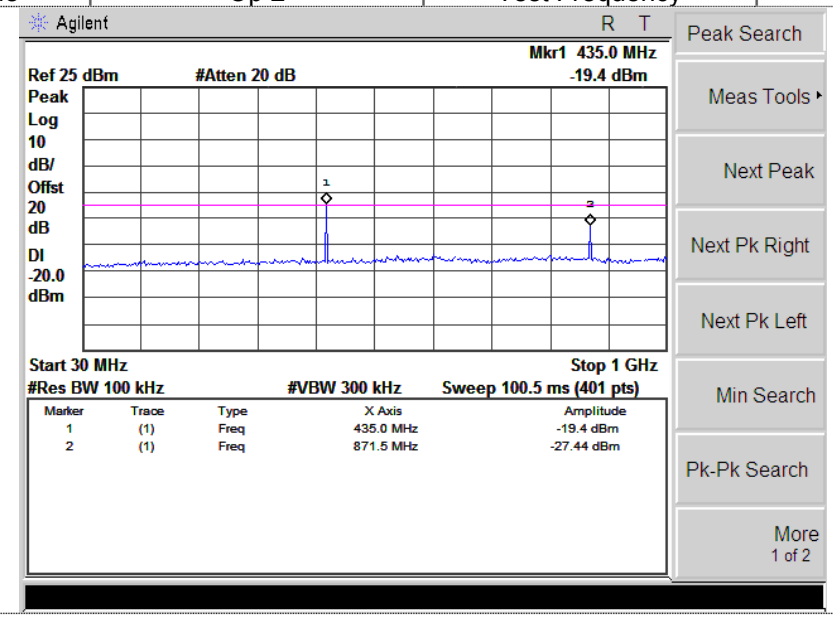


30MHz-1GHz

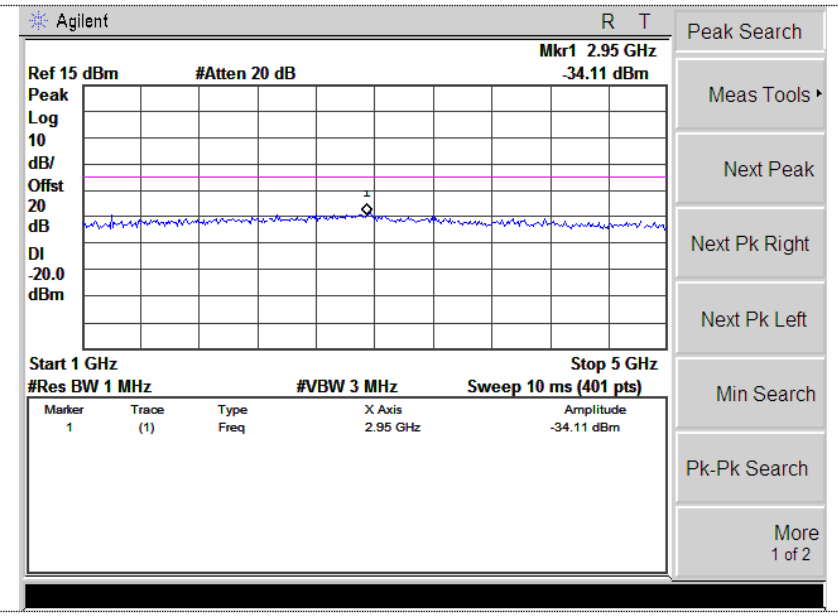


1GHz-5GHz

Operation Mode	Op 2	Test Frequency	435.0125MHz

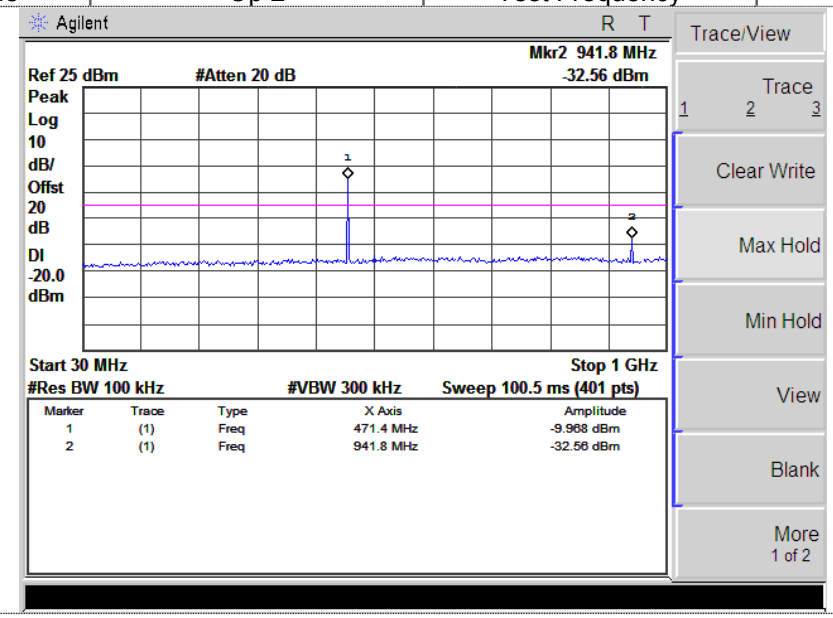


30MHz-1GHz

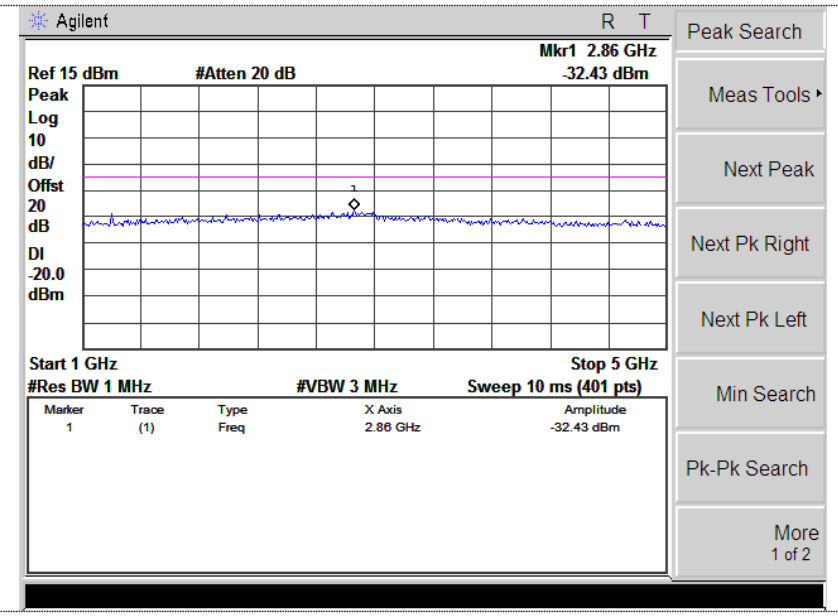


1GHz-5GHz

Operation Mode	Op 2	Test Frequency	469.9875MHz



30MHz-1GHz



1GHz-5GHz

4.8. Transmitter Radiated Spurious Emssion

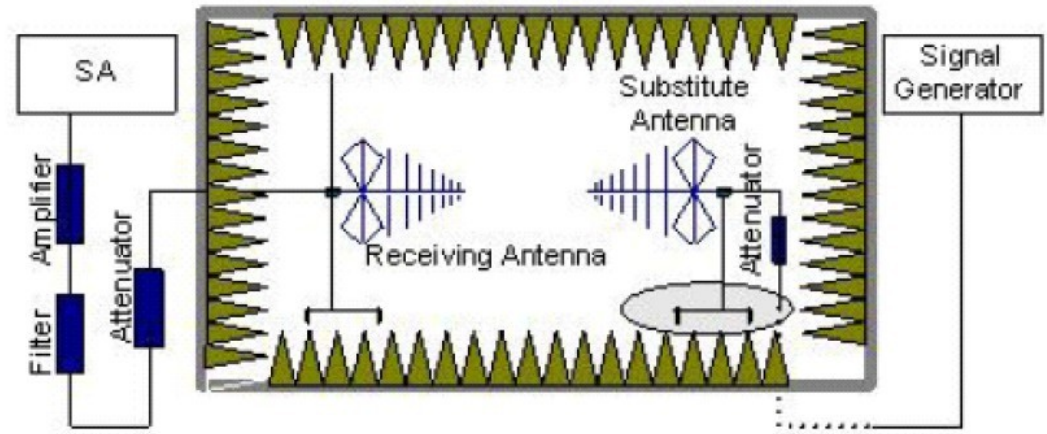
TEST APPLICABLE

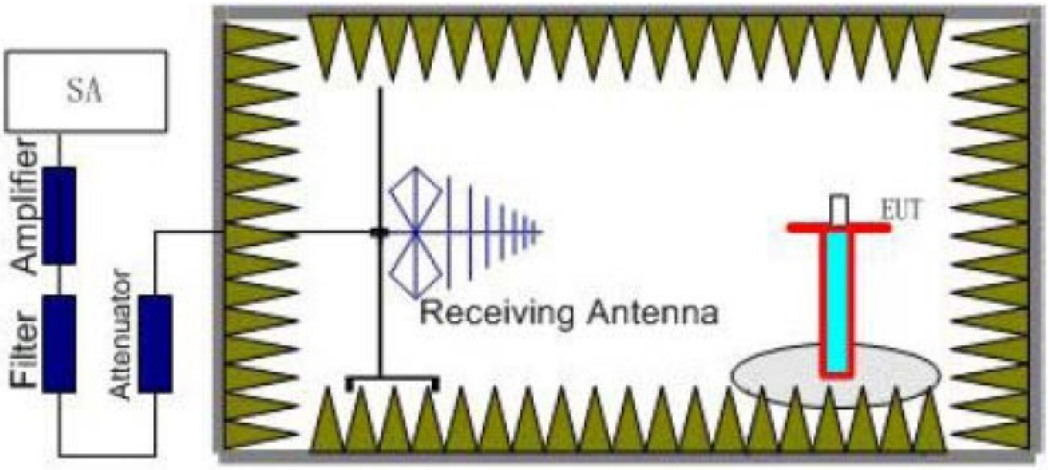
According to the TIA/EIA 603 D test method, and according to Section 90.210, the power of each unwanted emission shall be less than Transmitted Power as specified below for transmitters designed to operate with 12.5 kHz channel bandwidth:

1 On any frequency removed from the center of the authorized bandwidth fo to 5.625 kHz removed from fo: Zero dB
2 On any frequency removed from the center of the authorized bandwidth by a displacement frequency (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 kHz) dB.
3 On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) fo of more than 12.5 kHz: At least 50+10 log (P) dB or 70 dB, which ever is lesser attenuation.

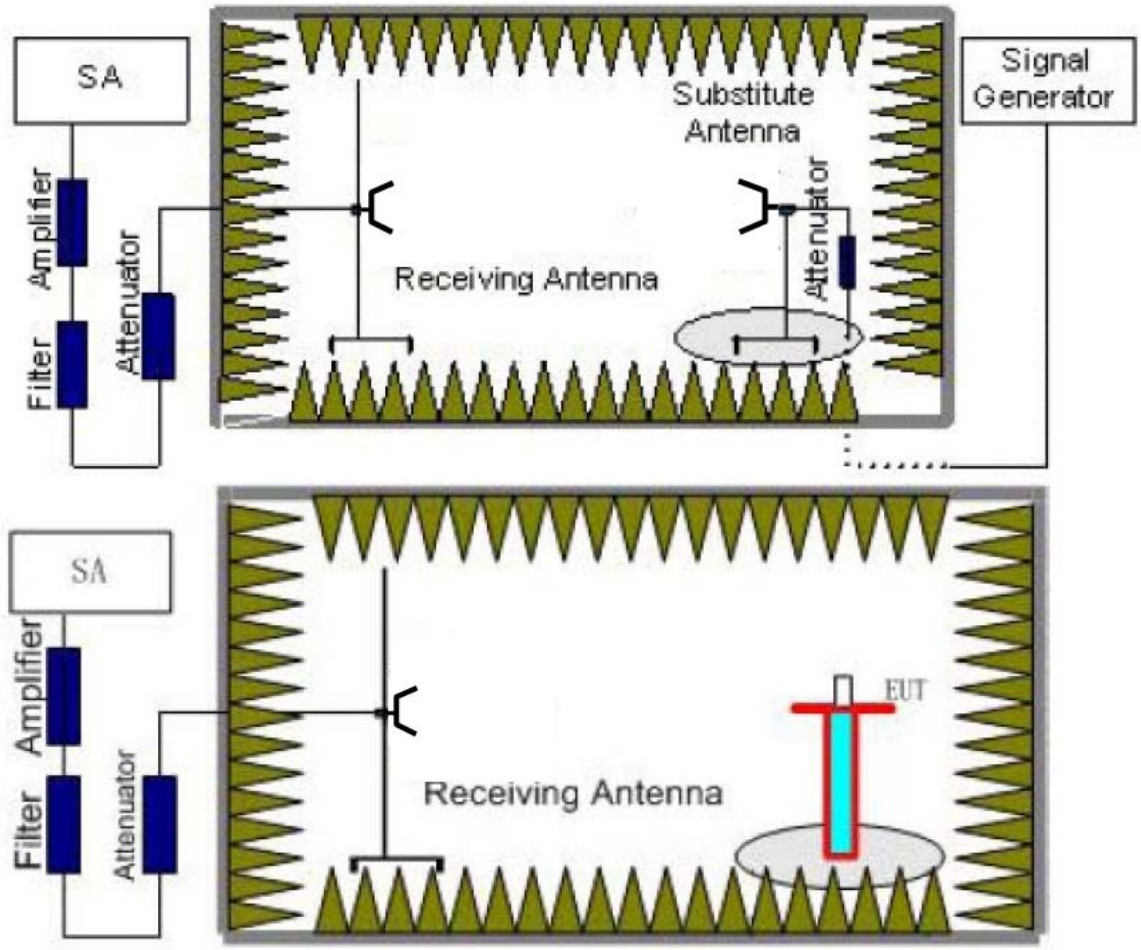
TEST CONFIGURATION

Below 1GHz:





Above 1GHz:



TEST PROCEDURE

1. EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0 m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in six channels were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} - G_a
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=P_{Mea}- P_{cl} - G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

LIMIT

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:
High Power: $50 + 10 \log_{10}(\text{Pwatts}) = 50 + 10\log_{10}(4.6) = 56.63\text{dB}$
Low Power: $50 + 10 \log_{10}(\text{Pwatts}) = 50 + 10\log_{10}(0.97) = 49.87\text{dB}$

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 36.63 dBm.
Limit (dBm) $=36.63-50-10\log_{10}(4.6) = -20\text{dBm}$

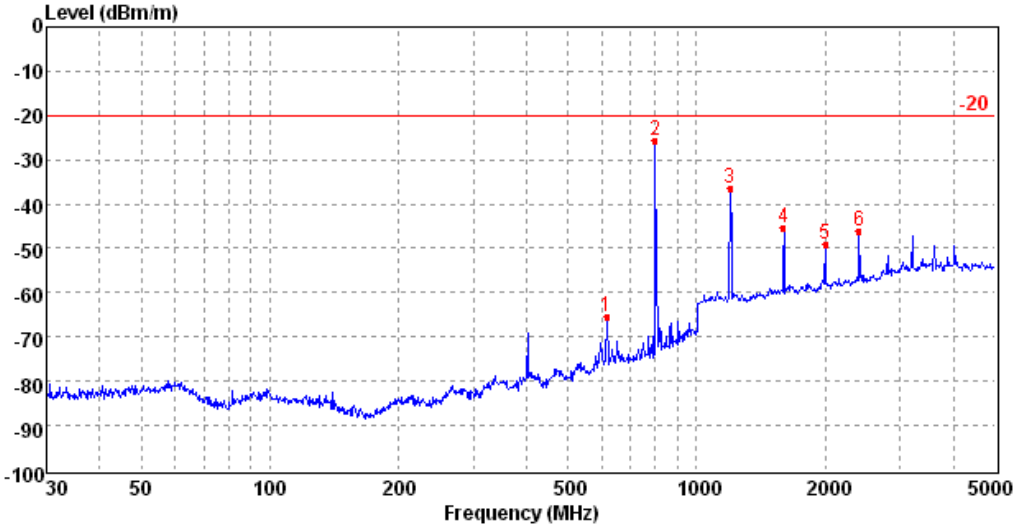
TEST RESULTS

Remark:We tested and recorded Op 1 to Op 2, recorded worst case at Op 1.

Note: 1. In general, the worse case attenuation requirement shown above was applied.
2. The measurement frequency range from 30 MHz to 5 GHz.

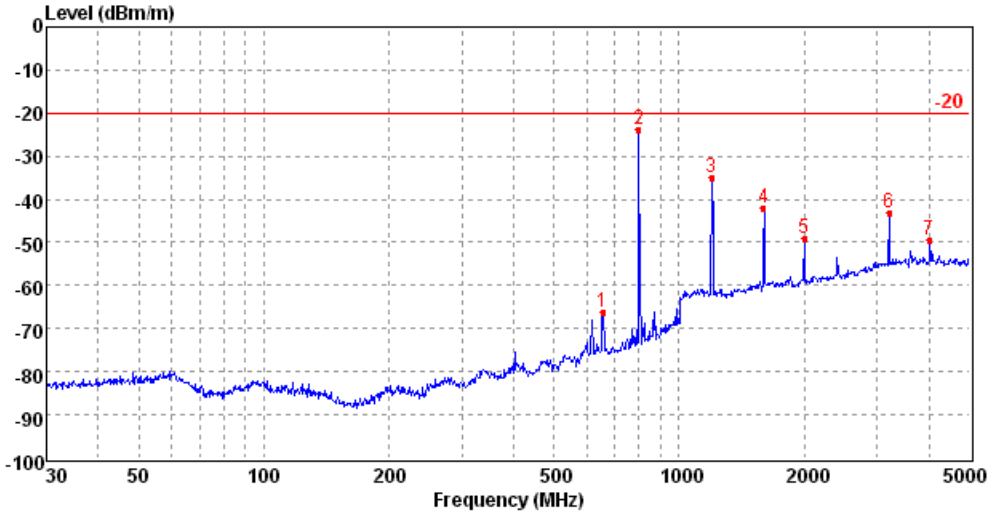
Test plot as follows:

Op 1			
Test Frequency:	400.0125 MHz	Polarity:	Horizontal



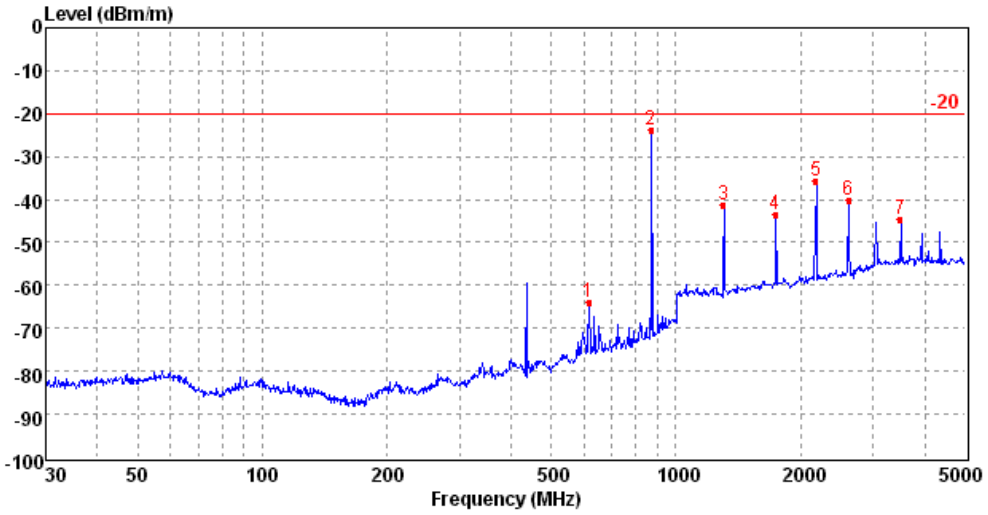
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	615.16	-71.48	31.71	2.90	28.74	-65.61	-20.00	-45.61	Peak
2	800.80	-33.84	33.27	3.30	28.51	-25.78	-20.00	-5.78	Peak
3	1199.45	-43.49	39.09	4.52	36.51	-36.39	-20.00	-16.39	Peak
4	1599.92	-53.97	40.27	5.40	36.93	-45.23	-20.00	-25.23	Peak
5	2001.04	-58.95	41.05	6.15	37.25	-49.00	-20.00	-29.00	Peak
6	2400.16	-57.38	42.14	6.83	37.58	-45.99	-20.00	-25.99	Peak

Test Frequency:	400.0125MHz	Polarity:	Vertical



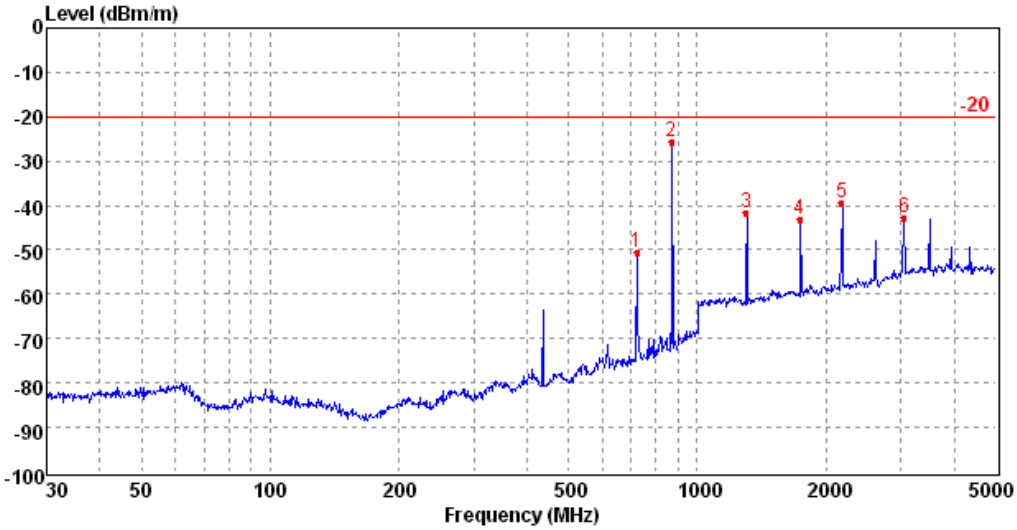
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	655.35	-72.41	31.86	3.02	28.69	-66.22	-20.00	-46.22	Peak
2	800.80	-31.74	33.27	3.30	28.51	-23.68	-20.00	-3.68	Peak
3	1199.45	-41.96	39.09	4.52	36.51	-34.86	-20.00	-14.86	Peak
4	1599.92	-50.77	40.27	5.40	36.93	-42.03	-20.00	-22.03	Peak
5	2001.04	-58.90	41.05	6.15	37.25	-48.95	-20.00	-28.95	Peak
6	3201.51	-57.03	43.50	8.45	37.99	-43.07	-20.00	-23.07	Peak
7	4004.17	-64.61	44.73	8.61	37.99	-49.26	-20.00	-29.26	Peak

Op 1			
Test Frequency:	435.0125 MHz	Polarity:	*Horizontal*



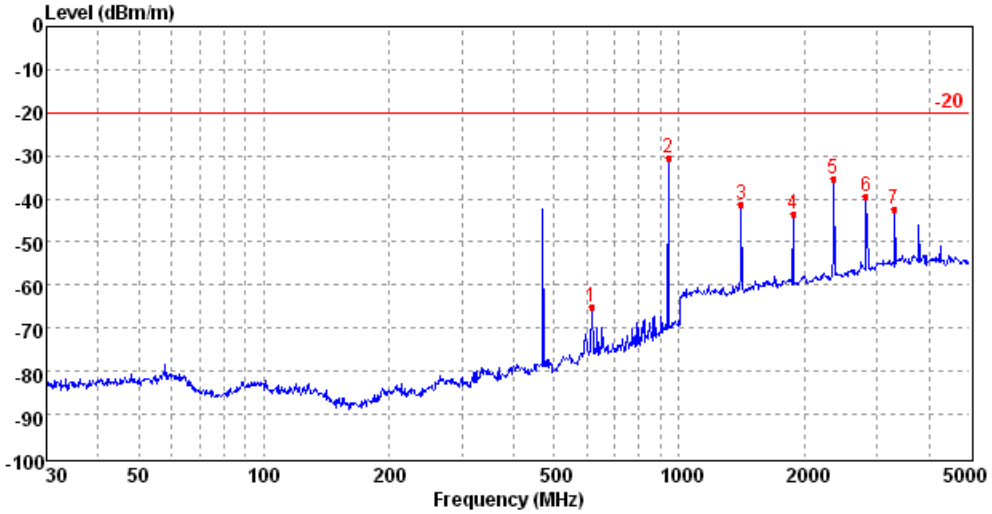
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	615.16	-69.71	31.71	2.90	28.74	-63.84	-20.00	-43.84	Peak
2	871.32	-33.71	34.75	3.55	28.44	-23.85	-20.00	-3.85	Peak
3	1304.16	-48.85	39.45	4.77	36.63	-41.26	-20.00	-21.26	Peak
4	1739.59	-52.52	40.57	5.68	37.05	-43.32	-20.00	-23.32	Peak
5	2175.72	-46.20	41.55	6.46	37.40	-35.59	-20.00	-15.59	Peak
6	2609.67	-52.06	42.57	7.26	37.74	-39.97	-20.00	-19.97	Peak
7	3480.98	-59.19	43.75	8.77	37.99	-44.66	-20.00	-24.66	Peak

Test Frequency:	435.0125MHz	Polarity:	Vertical



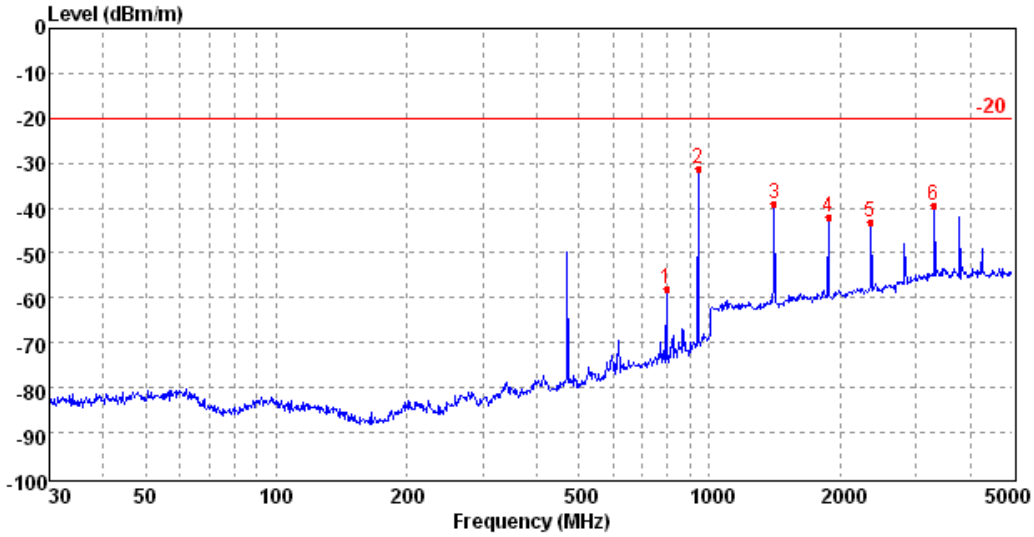
Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	723.16	-57.49	32.32	3.18	28.60	-50.59	-20.00	-30.59	Peak
2	871.32	-35.40	34.75	3.55	28.44	-25.54	-20.00	-5.54	Peak
3	1304.16	-49.08	39.45	4.77	36.63	-41.49	-20.00	-21.49	Peak
4	1739.59	-52.36	40.57	5.68	37.05	-43.16	-20.00	-23.16	Peak
5	2175.72	-50.19	41.55	6.46	37.40	-39.58	-20.00	-19.58	Peak
6	3045.70	-56.28	43.33	8.24	37.99	-42.70	-20.00	-22.70	Peak

Op 1			
Test Frequency:	469.9875 MHz	Polarity:	*Horizontal*



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	615.16	-70.90	31.71	2.90	28.74	-65.03	-20.00	-45.03	Peak
2	941.41	-42.53	36.64	3.64	28.37	-30.62	-20.00	-10.62	Peak
3	1408.90	-49.28	39.79	5.00	36.75	-41.24	-20.00	-21.24	Peak
4	1879.30	-53.23	40.84	5.94	37.16	-43.61	-20.00	-23.61	Peak
5	2350.46	-46.55	42.02	6.75	37.55	-35.33	-20.00	-15.33	Peak
6	2819.27	-52.33	42.96	7.77	37.88	-39.48	-20.00	-19.48	Peak
7	3290.32	-56.54	43.58	8.55	37.99	-42.40	-20.00	-22.40	Peak

Test Frequency:	469.9875MHz	Polarity:	Vertical



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	795.19	-66.01	33.21	3.30	28.52	-58.02	-20.00	-38.02	Peak
2	941.41	-42.99	36.64	3.64	28.37	-31.08	-20.00	-11.08	Peak
3	1408.90	-47.24	39.79	5.00	36.75	-39.20	-20.00	-19.20	Peak
4	1879.30	-51.63	40.84	5.94	37.16	-42.01	-20.00	-22.01	Peak
5	2350.46	-54.44	42.02	6.75	37.55	-43.22	-20.00	-23.22	Peak
6	3290.32	-53.70	43.58	8.55	37.99	-39.56	-20.00	-19.56	Peak

4.9. Receiver Radiated Spurious Emssion

TEST APPLICABLE

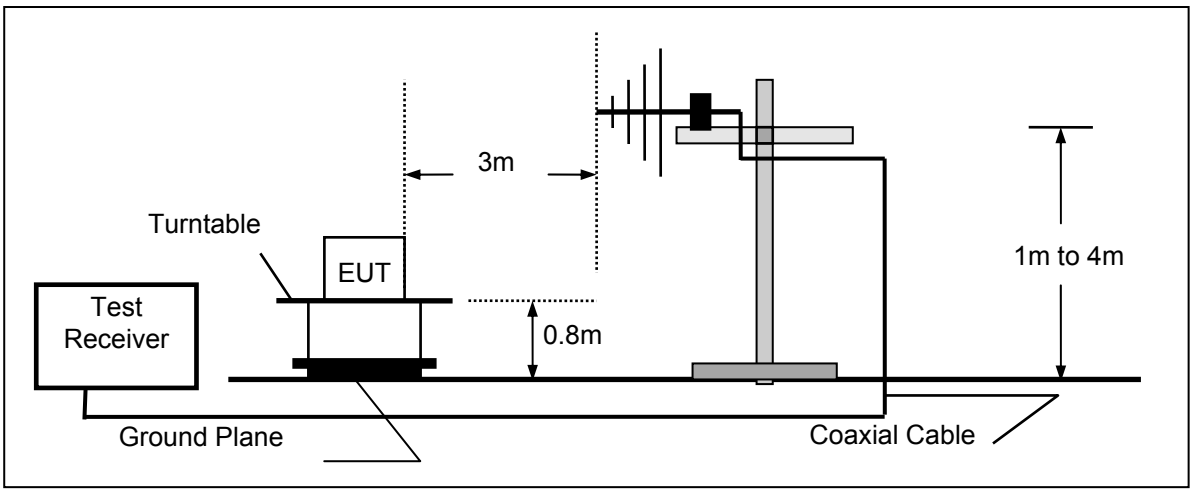
The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL – AG

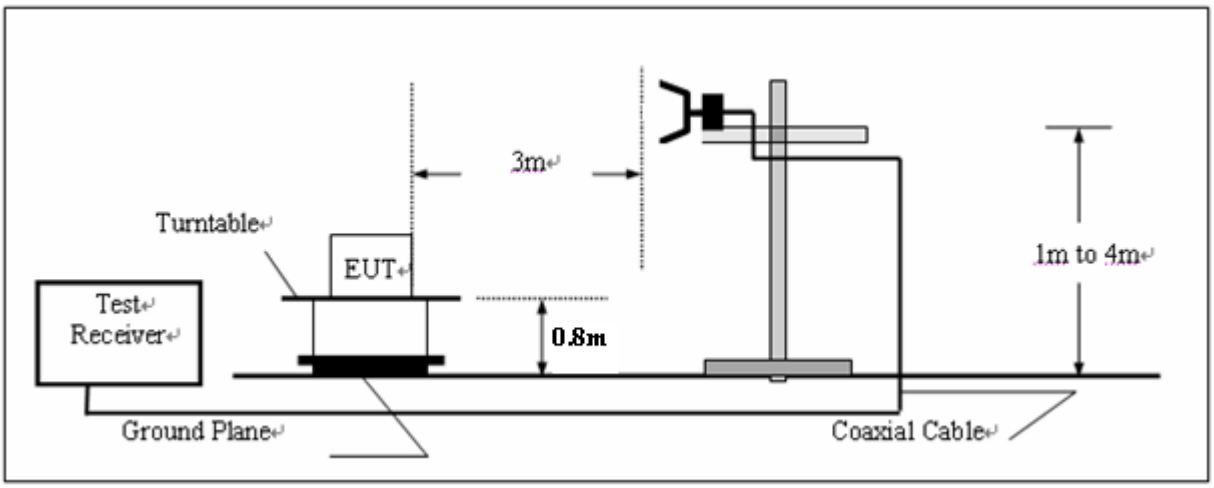
Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

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

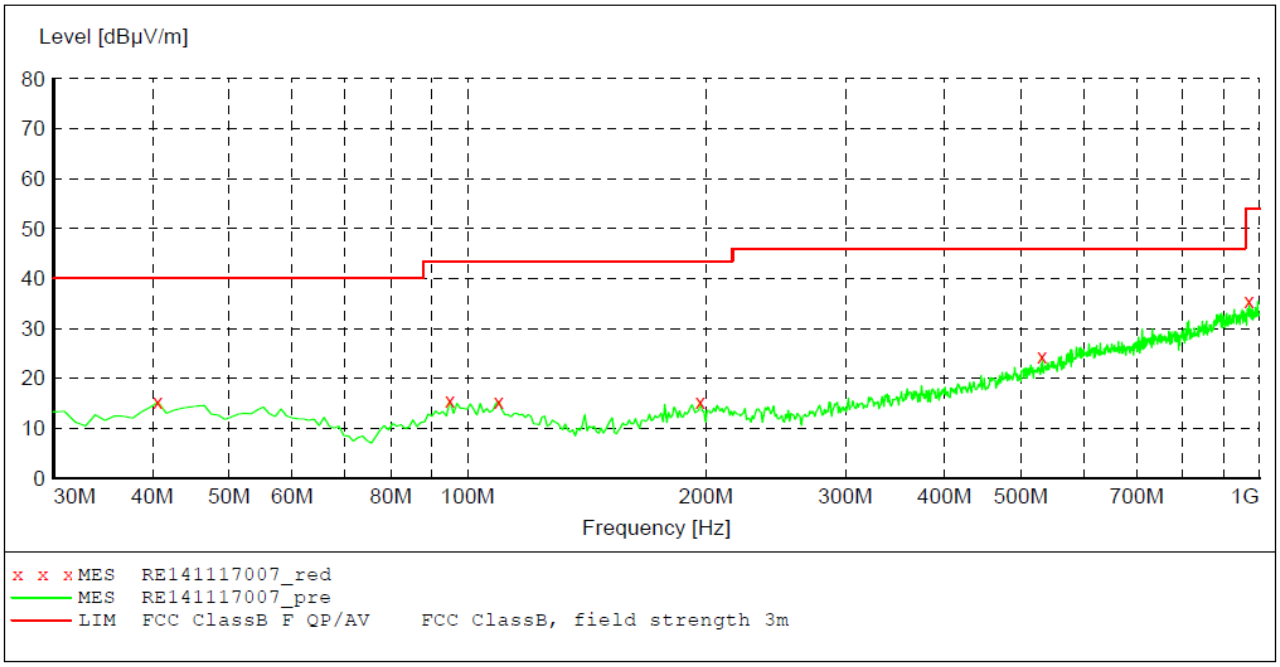
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

TEST RESULTS

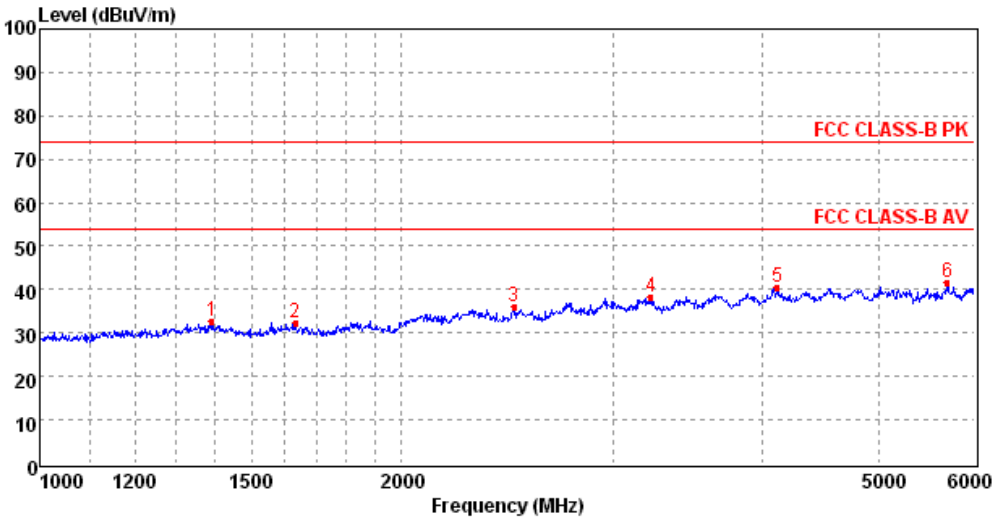
Remak:

1. The Radiated Measurement (Standby mode /Receiver mode) are performed to the three channels (the high channel, the middle channel and the low 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.
2. Test performed at Op 3 ,Op 4 operation mode respectively.And the datum append below is the worst case Op 3 at 435.0125MHz(Test Frequency) of each operation mode.

Op 3			
Test Frequency:	435.0125MHz	Polarity:	*Horizontal*

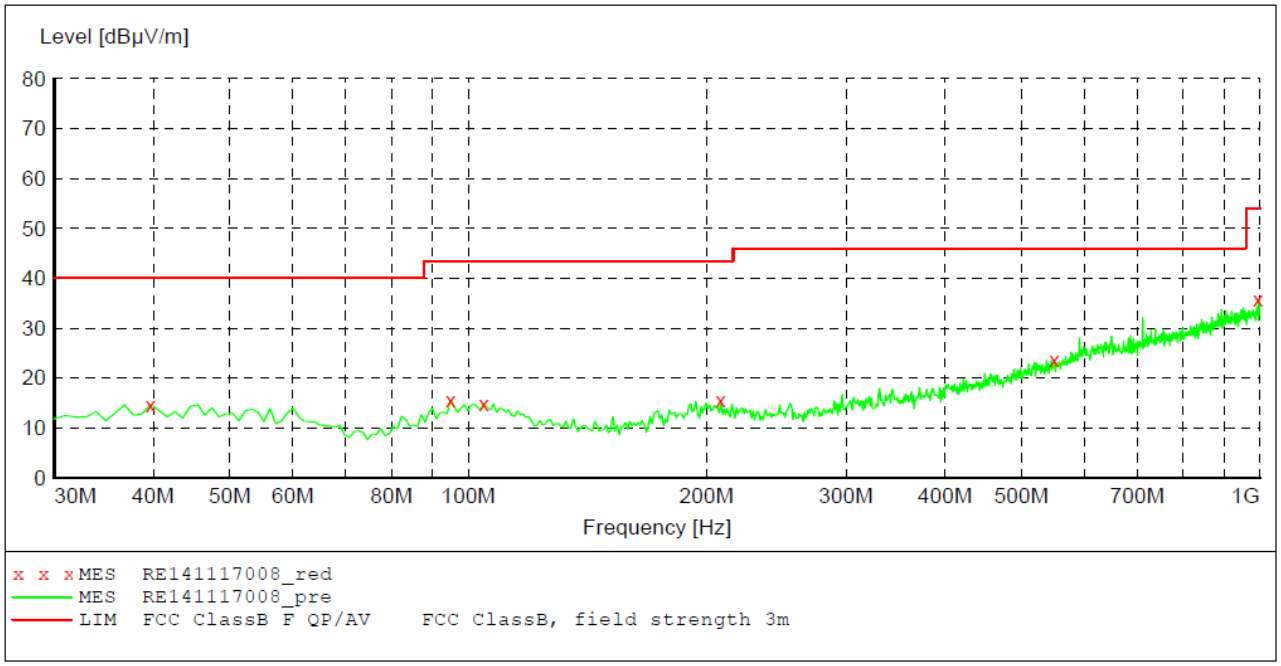


Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
40.670000	15.30	-15.0	40.0	24.7	QP	100.0	180.00	HORIZONTAL
94.990000	15.50	-14.3	40.0	24.5	QP	100.0	44.00	HORIZONTAL
109.540000	15.40	-14.6	40.0	24.6	QP	100.0	349.00	HORIZONTAL
196.840000	15.40	-14.6	40.0	24.6	QP	100.0	349.00	HORIZONTAL
531.490000	24.40	-6.0	46.0	22.6	QP	100.0	273.00	HORIZONTAL
970.900000	35.60	3.9	46.0	11.4	QP	100.0	0.00	HORIZONTAL

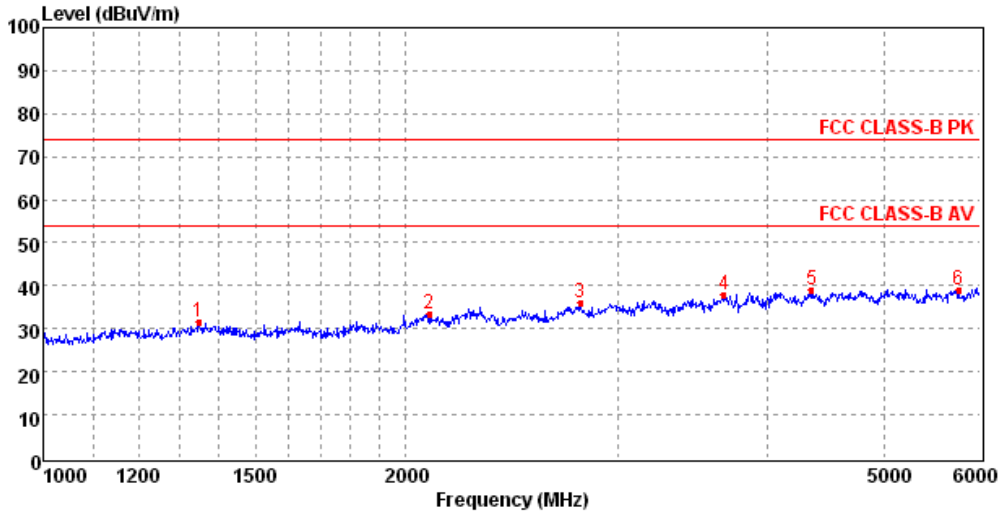


Mark	Frequency MHz	Level dBuv/m	Factor dB	Reading dBuv/m	Limit dBuv/m	Margin dB	Polarization	Det.
1	1390.53	32.58	-8.08	40.66	74.00	41.42	HORIZONTAL	Peak
2	1630.93	32.51	-8.38	40.89	74.00	41.49	HORIZONTAL	Peak
3	2480.41	36.03	-5.22	41.25	74.00	37.97	HORIZONTAL	Peak
4	3227.83	38.45	-2.84	41.29	74.00	35.55	HORIZONTAL	Peak
5	4111.13	40.46	0.03	40.43	74.00	33.54	HORIZONTAL	Peak
6	5696.20	41.66	3.62	38.04	74.00	32.34	HORIZONTAL	Peak

Op 3			
Test Frequency:	435.0125MHz	Polarity:	Vertical

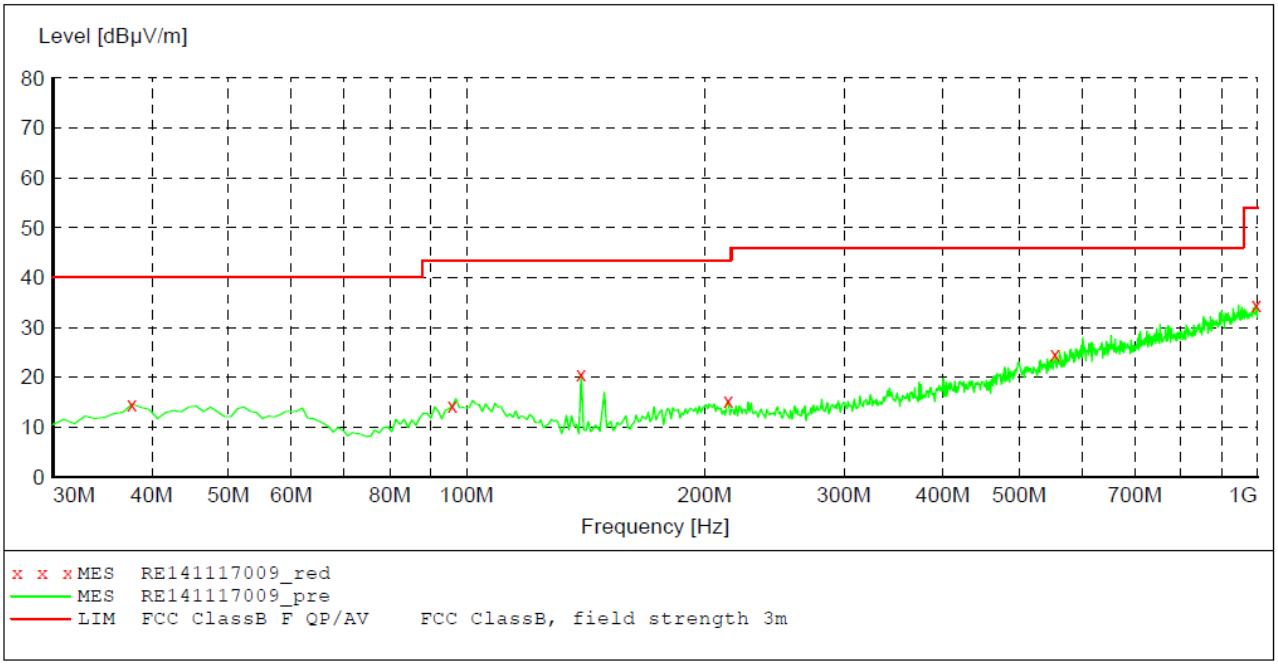


Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
39.700000	14.70	-15.1	40.0	25.3	QP	100.0	6.00	VERTICAL
94.990000	15.60	-14.3	40.0	24.4	QP	100.0	221.00	VERTICAL
104.690000	14.90	-14.1	40.0	25.1	QP	100.0	321.00	VERTICAL
208.480000	15.50	-14.9	40.0	24.5	QP	100.0	66.00	VERTICAL
549.920000	23.60	-5.4	46.0	23.4	QP	100.0	6.00	VERTICAL
995.150000	35.70	4.4	46.0	11.3	QP	100.0	66.00	VERTICAL

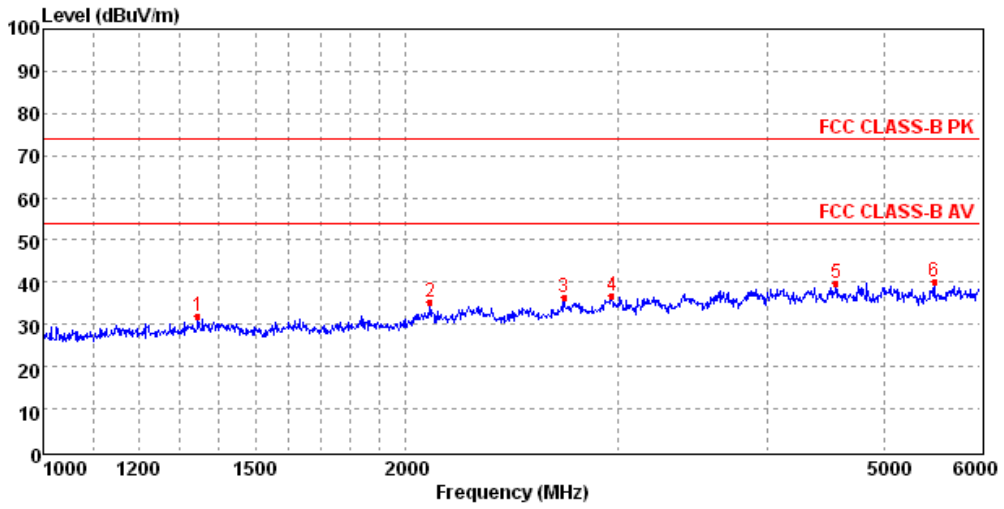


Mark	Frequency MHz	Level dBuv/m	Factor dB	Reading dBuv/m	Limit dBuv/m	Margin dB	Polarization	Det.
1	1346.40	31.51	-8.02	39.53	74.00	42.49	VERTICAL	Peak
2	2092.18	33.49	-5.99	39.48	74.00	40.51	VERTICAL	Peak
3	2791.78	36.24	-3.85	40.09	74.00	37.76	VERTICAL	Peak
4	3678.88	38.02	-1.50	39.52	74.00	35.98	VERTICAL	Peak
5	4345.94	39.04	0.73	38.31	74.00	34.96	VERTICAL	Peak
6	5757.76	39.14	3.90	35.24	74.00	34.86	VERTICAL	Peak

Op 4			
Test Frequency:	1575.42MHz	Polarity:	*Horizontal*

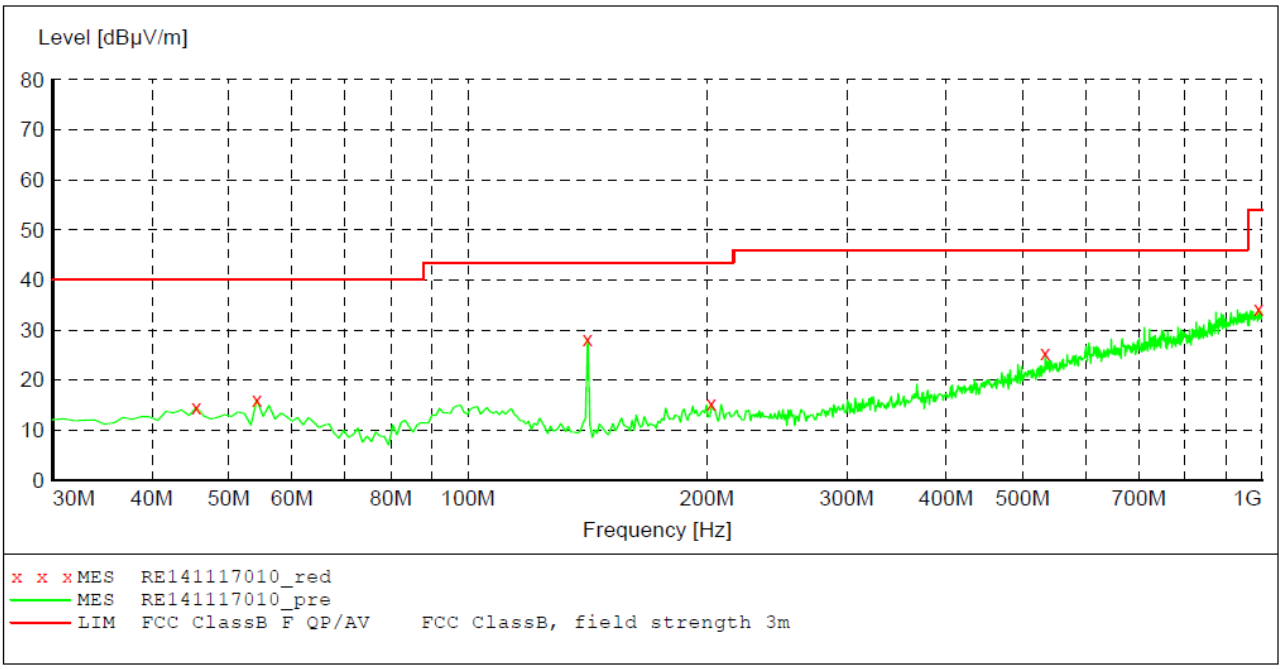


Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
37.760000	14.60	-15.6	40.0	25.4	QP	100.0	348.00	HORIZONTAL
95.960000	14.30	-14.2	40.0	25.7	QP	100.0	0.00	HORIZONTAL
139.610000	20.60	-18.5	40.0	19.4	QP	100.0	107.00	HORIZONTAL
214.300000	15.30	-15.0	40.0	24.7	QP	100.0	107.00	HORIZONTAL
554.770000	24.70	-5.3	46.0	22.3	QP	100.0	348.00	HORIZONTAL
997.090000	34.50	4.5	46.0	12.5	QP	100.0	348.00	HORIZONTAL

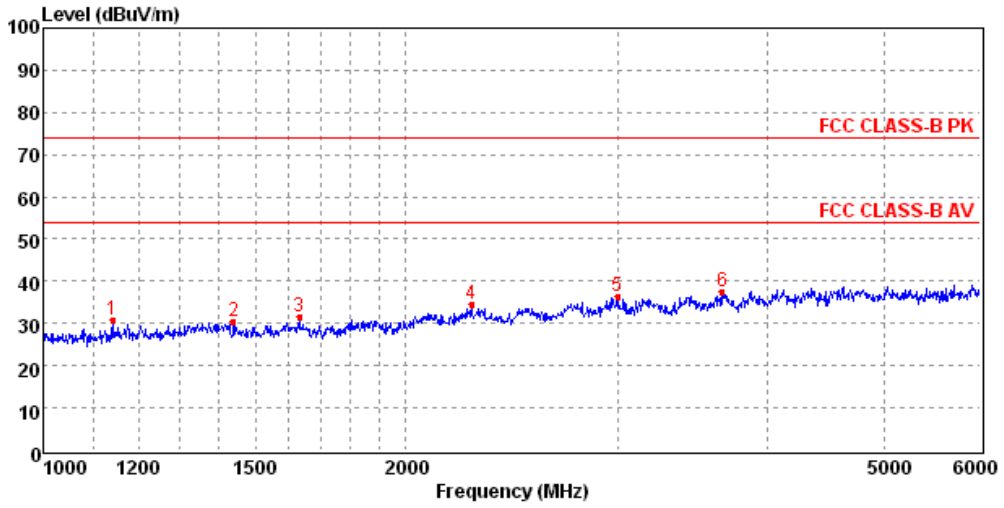


Mark	Frequency MHz	Level dBuv/m	Factor dB	Reading dBuv/m	Limit dBuv/m	Margin dB	Polarization	Det.
1	1343.99	31.91	-8.01	39.92	74.00	42.09	HORIZONTAL	Peak
2	2095.93	35.33	-5.95	41.28	74.00	38.67	HORIZONTAL	Peak
3	2708.02	36.29	-4.28	40.57	74.00	37.71	HORIZONTAL	Peak
4	2967.14	36.86	-3.34	40.20	74.00	37.14	HORIZONTAL	Peak
5	4553.19	39.74	1.26	38.48	74.00	34.26	HORIZONTAL	Peak
6	5495.69	40.18	3.46	36.72	74.00	33.82	HORIZONTAL	Peak

Op 4			
Test Frequency:	1575.42MHz	Polarity:	Vertical

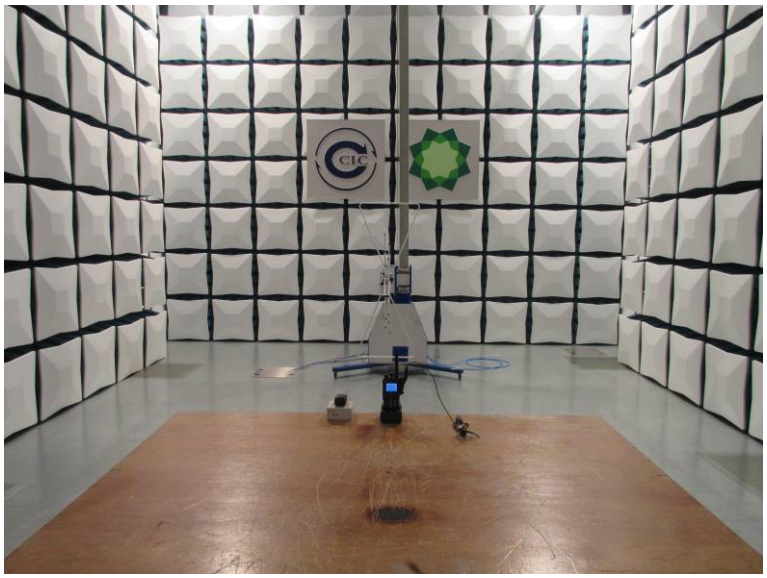


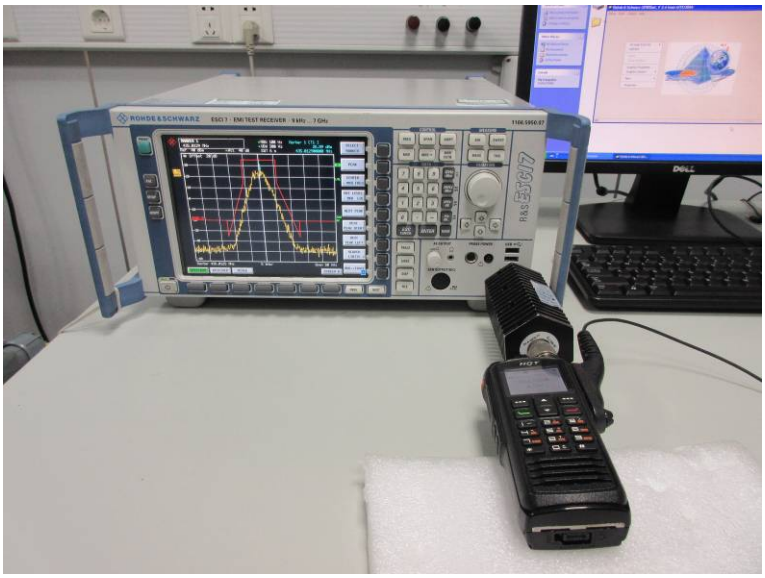
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	14.60	-15.0	40.0	25.4	QP	100.0	7.00	VERTICAL
54.250000	16.10	-15.4	40.0	23.9	QP	100.0	207.00	VERTICAL
141.550000	28.30	-18.5	40.0	11.7	QP	100.0	309.00	VERTICAL
202.660000	15.30	-14.6	40.0	24.7	QP	100.0	207.00	VERTICAL
533.430000	25.30	-5.9	46.0	21.7	QP	100.0	269.00	VERTICAL
990.300000	34.20	4.3	46.0	12.8	QP	100.0	349.00	VERTICAL



Mark	Frequency MHz	Level dBuv/m	Factor dB	Reading dBuv/m	Limit dBuv/m	Margin dB	Polarization	Det.
1	1141.78	30.77	-9.43	40.20	74.00	43.23	VERTICAL	Peak
2	1438.68	30.54	-8.19	38.73	74.00	43.46	VERTICAL	Peak
3	1630.93	31.44	-8.38	39.82	74.00	42.56	VERTICAL	Peak
4	2267.85	34.58	-4.97	39.55	74.00	39.42	VERTICAL	Peak
5	2999.21	36.50	-3.34	39.84	74.00	37.50	VERTICAL	Peak
6	3665.72	37.42	-1.54	38.96	74.00	36.58	VERTICAL	Peak

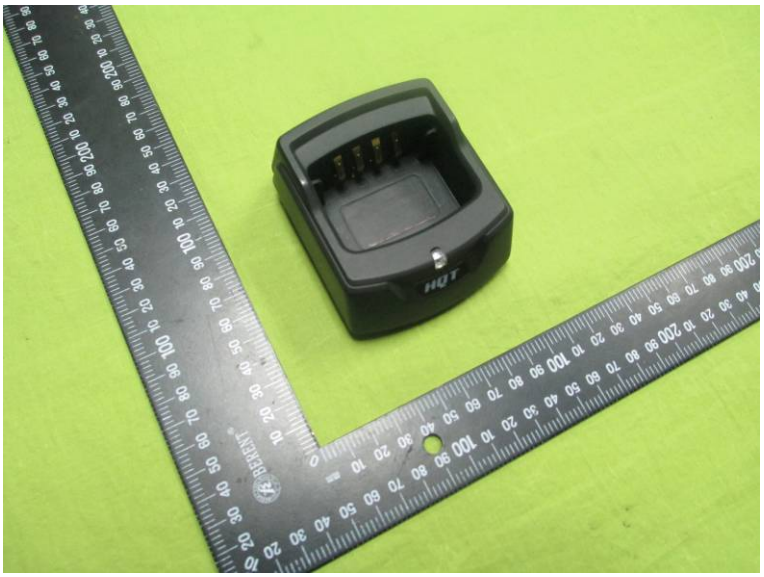
5. Test Setup Photos of the EUT




ROHDE&SCHWARZ
ESCI7 · EMI TEST RECEIVER · 9 kHz ... 7 GHz
R&S ESCI7

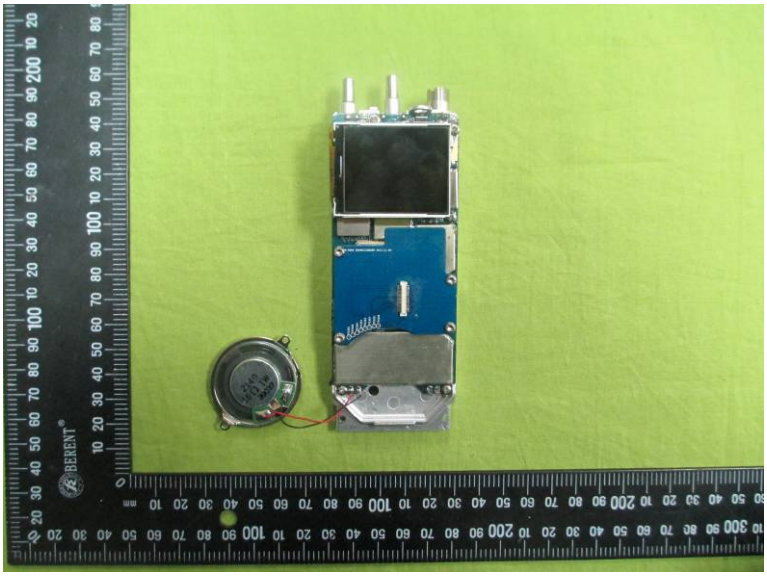
6. External and Internal Photos of the EUT

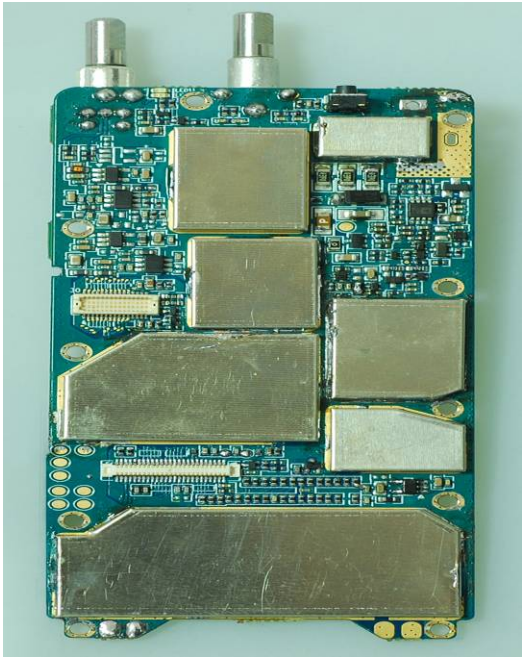
External photos of the EUT

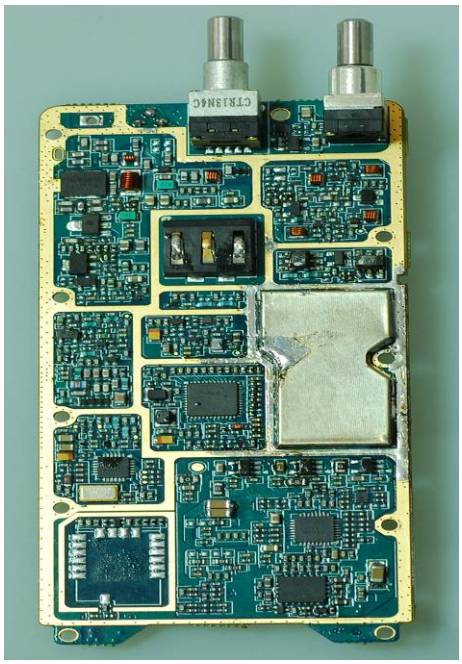

HQT

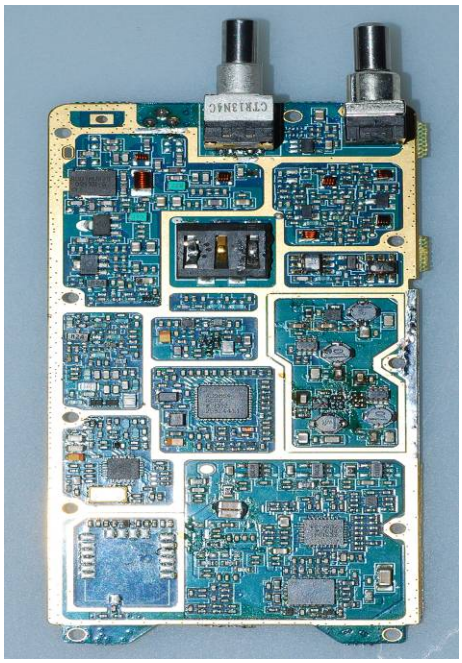
HQT

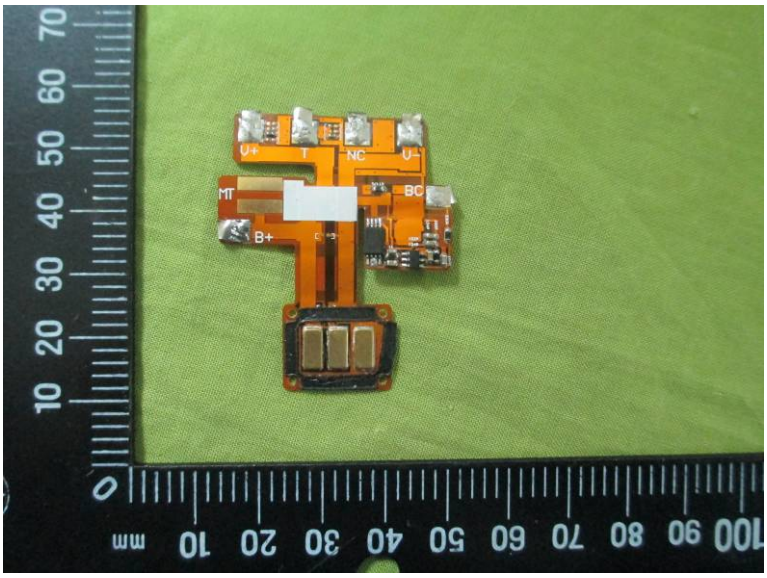
Internal photos of the EUT






CTR13N4C





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