TEST REPORT

KOSTEC CO., Ltd. 28(175-20, Annyeong-dong) 406-gil sejaro, Hwaseong-si, Gueonggi-do, Korea Tel:031-222-4251, Fax:031-222-4252	Report No.: KST-FCR-160010	KOSTEC Co., Ltd. http://www.kostec.org

1. Applicant

   • Name : Dogtra Co., Ltd.

   • Address : #715-2(146BL-3L) Gojan-dong, Namdong-gu, Incheon, Korea

2. Test Item

   • Product Name: Pathfinder

   • Model Name: PC10U

   • Brand: None

   • FCC ID: SWN-PC10U

3. Manufacturer

   • Name : Dogtra Co., Ltd.

   • Address : #715-2(146BL-3L) Gojan-dong, Namdong-gu, Incheon, Korea

4. Date of Test : 2016. 09. 19. ~ 2016. 09. 20.

5. Test Method Used : FCC CFR 47, Part 95
   ANSI/TIA-603-D-2010

6. Test Result : Compliance

7. Note: None

Supplementary Information

The device bearing the brand name and FCC ID specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with measurement procedures specified in ANSI/TIA-603-D-2010.

We attest to the accuracy of data and all measurements reported herein were performed by KOSTEC Co., Ltd. and were made under Chief Engineer's supervision. We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Affirmation	Tested by Name : Lee, Mi-Young (Signature)	Technical Manager Name : Park, Gyeong-Hyeon (Signature)

2016. 09. 26.

KOSTEC Co., Ltd.

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1. GENERAL INFORMATION

1.1 Test Facility

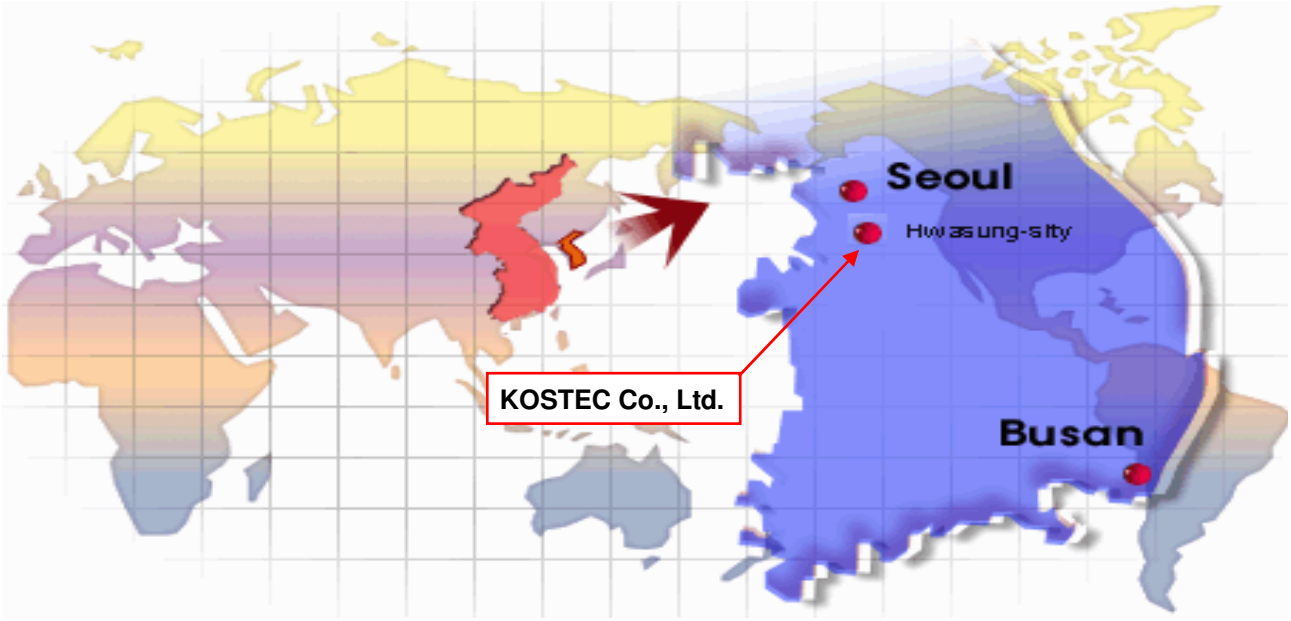
Test laboratory and address

KOSTEC Co., Ltd.
128(175-20,Annyeong-dong)406-gil sejaro, Hwaseong-si Gyeonggi-do, Korea

Registration information

KOLAS No. : 232
FCC Designation No. : KR0041
IC Registration Site No. : 8305A

1.2 Location



1.3 Revision History of test report

Rev.	Revisions	Effect page	Reviewed	Date
-	Initial issue	All	Gyeong Hyeon, Park	2016. 09. 26.

2. EQUIPMENT DESCRIPTION

The product specification described herein was declared by manufacturer. And refer to user's manual for the details.

Equipment Name	Pathfinder
Model No	PC10U
Usage	MURS radio for dog
Serial Number	Proto type
Modulation type	FSK
Emission Type	F1D
Maximum output power	1.4 W
Operated Frequency	151.820 MHz ~ 154.600 MHz
Channel Number	5 ea
Operation temperature	-10 ℃ ~ 55 ℃
Power Source	Li-Po battery / DC 3.7 V / 2350 mA
Antenna Description	Helical antenna with SMA connector, gain : 0 dBi
Remark	1. The device was operating at its maximum output power for all measurements. 2. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case (X) is shown in the report. 3. The above DUT's information was declared by manufacturer. Please refer to the specifications or user manual for more detailed description.
FCC ID	SWN-PC10U

3. SYSTEM CONFIGURATION FOR TEST

3.1 Characteristics of equipment

MURS radio for dog.

3.2 Used peripherals list

Description	Model No.	Serial No.	Manufacture	Remark

3.3 Product Modification

N/A

3.4 Operating Mode

Constantly transmitting with a modulated carrier at maximum power.

3.5 Test Setup of EUT

EUT
(Standalone)

3.6 Table Table for Carrier Frequencies

Channel	Freq. [MHz]
1	151.820
2	151.880
3	151.940
4	154.570
5	154.600

3.7 Used Test Equipment List

No.	Instrument	Model	S/N	Manufacturer	Due to cal date	Cal interval	used
1	T & H Chamber	EY-101	90E14260	TABAI ESPEC	2017.09.07	1 year	☒
2	T & H Chamber	SH-641	92006831	ESPEC CORP	2017.02.04	1 year	☐
3	Spectrum Analyzer	8563E	3846A10662	Agilent Technology	2017.02.02	1 year	☐
4	Spectrum Analyzer	8593E	3710A02859	Agilent Technology	2017.02.02	1 year	☐
5	Spectrum Analyzer	FSV30	20-353063	Rohde& Schwarz	2017.02.02	1 year	☒
6	Signal Analyzer	N9020A	MY50410369	Agilent Technologies	2017.05.04	1 year	☒
7	EMI Test Receiver	ESCI7	100823	Rohde& Schwarz	2017.02.02	1 year	☒
8	EMI Test Receiver	ESI	837514/004	Rohde& Schwarz	2017.09.07	1 year	☒
9	Vector Signal Analyzer	89441A	3416A02620	Agilent Technology	2017.02.04	1 year	☐
10	Network Analyzer	8753ES	US39172348	AGILENT	2017.09.06	1 year	☐
11	EPM Series Power meter	E4418B	GB39512547	Agilent Technology	2017.02.03	1 year	☐
12	RF Power Sensor	E9300A	MY41496631	Agilent Technology	2017.02.03	1 year	☐
13	Microwave Frequency Counter	5352B	2908A00480	Agilent Technology	2017.02.01	1 year	☐
14	Modulation Analyzer	8901A	3538A07071	Agilent Technology	2017.02.03	1 year	☐
15	Audio Analyzer	8903B	3514A16919	Agilent Technology	2017.02.01	1 year	☐
16	Audio Telephone Analyzer	DD-5601CID	520010281	CREDIX	2017.02.04	1 year	☐
17	Digital storage Oscilloscope	TDS3052	B015962	Tektronix	2017.09.06	1 year	☐
18	ESG-D Series Signal Generator	E4436B	US39260458	Agilent Technology	2017.02.03	1 year	☒
19	Vector Signal Generator	SMBV100A	257557	Rohde & Schwarz	2017.02.03	1 year	☐
20	Signal Generator	SMB100A	179628	Rohde & Schwarz	2017.06.02	1 year	☒
21	Tracking Source	85645A	070521-A1	Agilent Technology	2017.02.02	1 year	☐
22	SLIDAC	None	0207-4	Myoung sung Ele.	2017.02.01	1 year	☐
23	DC Power supply	DRP-5030	9028029	Digital Electronic Co.,Ltd	2017.02.01	1 year	☐
24	DC Power supply	6038A	3440A12674	Agilent Technology	2017.02.01	1 year	☐
25	DC Power supply	E3610A	KR24104505	Agilent Technology	2017.02.01	1 year	☐
26	DC Power supply	UP-3005T	68	Unicon Co.,Ltd	2017.02.01	1 year	☒
27	DC Power Supply	SM 3004-D	114701000117	DELTA ELEKTRONIKA	2017.02.01	1 year	☐
28	Dummy Load	8173	3780	Bird Electronic Co., Corp	2017.02.03	1 year	☐
29	Attenuator	50FH-030-500	140410 9433	JEW Idustries Inc.	2017.02.03	1 year	☐
30	Attenuator	765-20	9703	Narda	2017.09.06	1 year	☐
31	Attenuator	24-30-34	BX5630	Aeroflex / Weinschel	2016.12.30	1 year	☐
32	Attenuator	8498A	3318A09485	HP	2017.02.03	1 year	☒
33	Step Attenuator	8494B	3308A32809	HP	2017.02.03	1 year	☐
34	Attenuator	18B50W-20F	64671	INMET	2017.02.17	1 year	☐
35	Attenuator	10 dB	1	Rohde & Schwarz	2017.05.31	1 year	☐
36	Attenuator	54A-10	74564	WEINSCHEL	2017.06.02	1 year	☐
37	Attenuator	56-10	66920	WEINSCHEL	2017.06.17	1 year	☐
38	Power divider	11636B	51212	HP	2017.02.02	1 year	☐
39	3Way Power divider	KPDSU3W	00070365	KMW	2017.09.06	1 year	☐
40	4Way Power divider	70052651	173834	KRYTAR	2017.02.02	1 year	☐
41	3Way Power divider	1580	SQ361	WEINSCHEL	2017.06.02	1 year	☐
42	White noise audio filter	ST31EQ	101902	SoundTech	2017.09.07	1 year	☐
43	Dual directional coupler	778D	17693	HEWLETT PACKARD	2017.02.03	1 year	☐
44	Dual directional coupler	772D	2839A00924	HEWLETT PACKARD	2017.02.03	1 year	☐
45	Band rejection filter	3TNF-0006	26	DOVER Tech	2017.02.04	1 year	☐
46	Band rejection filter	3TNF-0008	317	DOVER Tech	2017.02.04	1 year	☐
47	Band rejection filter	3TNF-0007	311	DOVER Tech	2017.02.04	1 year	☐

No.	Instrument	Model	S/N	Manufacturer	Due to cal date	Cal interval	used
48	Band rejection filter	WTR-BRF2442-84NN	09020001	WAVE TECH Co.,LTD	2017.02.03	1 year	☐
49	Band rejection filter	WRCJV12-5695-5725-5825-5855-50SS	1	Wainwright Instruments GmbH	2017.05.31	1 year	☐
50	Band rejection filter	WRCJV12-5120-5150-5350-5380-40SS	4	Wainwright Instruments GmbH	2017.05.31	1 year	☐
51	Band rejection filter	WRCGV10-2360-2400-2500-2540-50SS	2	Wainwright Instruments GmbH	2017.05.31	1 year	☐
52	Highpass Filter	WHJS1100-10EF	1	WAINWRIGHT	2017.02.03	1 year	☐
53	Highpass Filter	WHJS3000-10EF	1	WAINWRIGHT	2017.02.03	1 year	☐
54	Highpass Filter	WHNX6-5530-3000-26500-40CC	2	Wainwright Instruments GmbH	2017.06.17	1 year	☐
55	Highpass Filter	WHNX6-2370-7000-26500-40CC	4	Wainwright Instruments GmbH	2017.06.17	1 year	☐
56	WideBand Radio Communication Tester	CMW500	102276	Rohde & Schwarz	2017.02.04	1 year	☐
57	Radio Communication Tester	CMU 200	112026	Rohde & Schwarz	2017.02.03	1 year	☐
58	Bluetooth Tester	TC-3000B	3000B6A0166	TESCOM CO., LTD.	2017.02.03	1 year	☐
59	RF Up/Down Converter	DCP-1780	980901003	CREDIX	2017.02.03	1 year	☐
60	DECT Test set	8923B	3829U00364	HP	2017.02.04	1 year	☐
61	DECT Test set	CMD60	840677/005	Rohde& Schwarz	2017.09.06	1 year	☐
62	Loop Antenna	6502	9203-0493	EMCO	2017.06.04	2 year	☒
63	BiconiLog Antenna	3142B	9910-1432	EMCO	2018.04.25	2 year	☒
64	Horn Antenna	3115	2996	EMCO	2018.02.11	2 year	☒
65	Horn Antenna	3160-09	061591-21907	ETS LINDGREN	2018.05.03	2 year	☐
66	Horn Antenna	3160-10	061221-022	ETS LINDGREN	2018.05.03	2 year	☐
67	Antenna Master(3)	AT13	None	AUDIX	N/A	N/A	☒
68	Turn Table(3)	None	None	AUDIX	N/A	N/A	☒
69	PREAMPLIFIER(3)	8449B	3008A02577	Agilent	2017.02.01	1 year	☒
70	Low noise Amplifier	TK-PA1840H	160010-L	TESKTEK	2017.07.05	1 year	☐
71	Antenna Master(10)	MA4000-EP	None	inno systems GmbH	N/A	N/A	☒
72	Turn Table(10)	None	None	inno systems GmbH	N/A	N/A	☒
73	AMPLIFIER(10)	TK-PA6S	120009	TESTEK	2017.02.02	1 year	☒

4. SUMMARY TEST RESULTS

Description of Test	FCC Rule	Reference Clause	Used	Test Result
RF OutputPower	Part 95.639(h)	Clause 5.1	☒	Compliance
Occupied Bandwidth	Part 95.633(f)	Clause 5.2	☒	Compliance
Emission Mask	Part 95.635(e)	Clause 5.3	☒	Compliance
Transmitter Radiated Unwanted Emissions	Part 95.635(e)	Clause 5.4	☒	Compliance
Frequency Stability	Part 95.632(c)	Clause 5.5	☒	Compliance
Compliance/pass : The EUT complies with the essential requirements in the standard. Not Compliance : The EUT does not comply with the essential requirements in the standard. N/A : The test was not applicable in the standard.				

Procedure Reference

FCC CFR 47, Part 95
ANSI/TIA-603-D-2010
ANSI C63.10-2013

5. MEASUREMENT RESULTS

5.1 RF Output Power

5.1.1 Standard Applicable [FCC Part 95.639(h)]

No MURS unit, under any condition of modulation, shall exceed 2 Watts transmitter power output.

5.1.2 Test Environment conditions

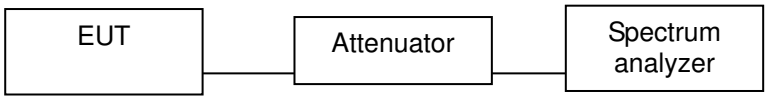
• Ambient temperature : (21 ~ 23) ℃ • Relative Humidity : (53 ~ 56) % R.H.

5.1.3 Measurement Procedure

The EUT was setup according to ANSI/TIA 603D:2010 for compliance to FCC 47CFR part 95 requirements.

The transmitter output was connected to the spectrum analyzer with an attenuator. The maximum peak output power was measured and recorded with the spectrum analyzer. EUT was programmed to be in continuously transmitting mode.

5.1.4 Test setup



5.1.5 Measurement Result

Channel	Frequency [MHz]	Conducted Power		Limit [W]	Test Results
		[dBm]	[W]		
1	151.820	31.35	1.4	2.0	Compliance
2	151.880	31.32	1.4	2.0	Compliance
3	151.940	31.33	1.4	2.0	Compliance
4	154.570	31.53	1.4	2.0	Compliance
5	154.600	31.51	1.4	2.0	Compliance

5.2 Occupied Bandwidth

5.2.1 Standard Applicable [FCC Part 95.633(f)]

The authorized bandwidth is 11.25 kHz on frequencies 151.820 MHz, 151.880 MHz and 151.940 MHz.
The authorized bandwidth is 20.0 kHz on frequencies 154.570 and 154.600 MHz.

5.2.2 Test Environment conditions

• Ambient temperature : (21 ~ 23) ℃ • Relative Humidity : (53 ~ 56) % R.H.

5.2.3 Measurement Procedure

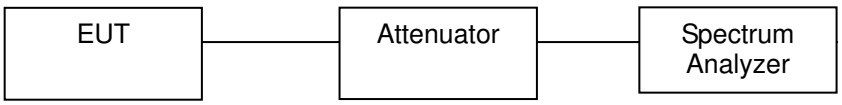
1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.

2. Measure the maximum width of the 99% occupied bandwidth is the frequency bandwidth of the signal power at the 99% channel power of occupied bandwidth.

The spectrum analyzer is set to the as follows :

- RBW : 300 Hz
- VBW : >3 x RBW
- Detector function : peak
- Trace : max hold

5.2.4 Test setup

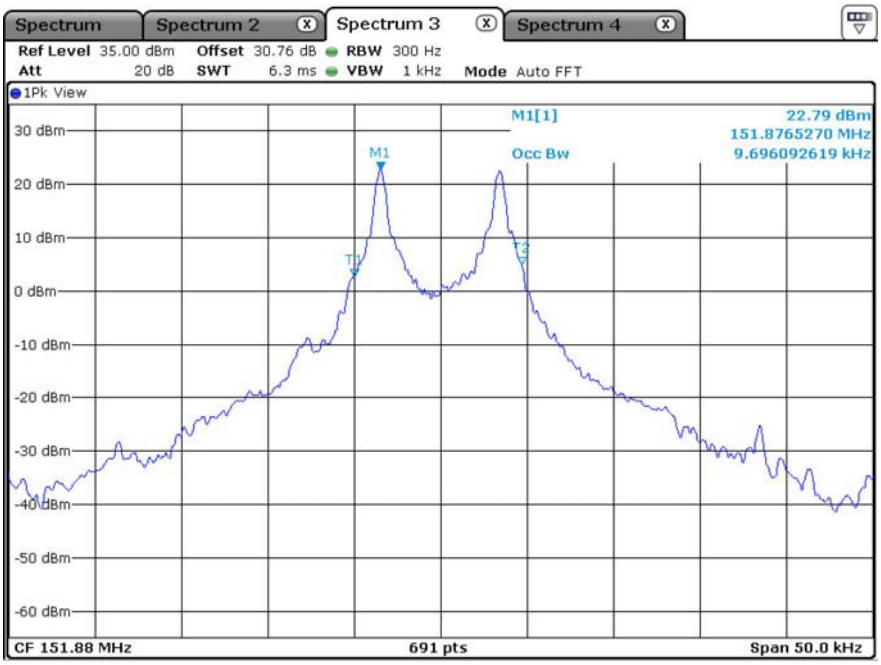


5.2.5 Measurement Result

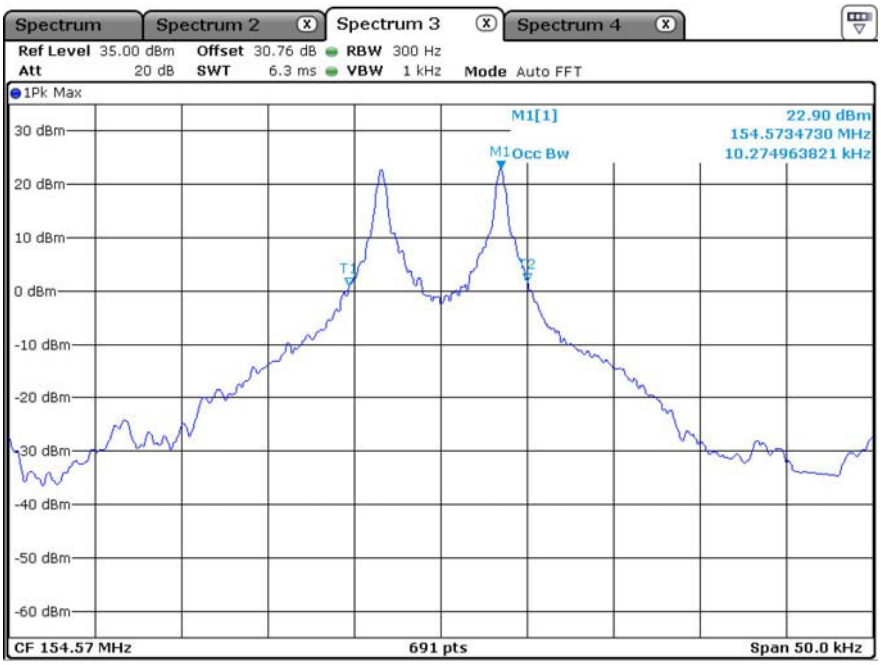
CH	Frequency [MHz]	99% Bandwidth [kHz]	Limit [kHz]	Test Results
2	151.880	9.70	11.25	Compliance
4	154.570	10.27	20.0	Compliance

5.2.6 Test Plot

(Ch2 : 151.880 MHz)



(Ch4 : 154.570 MHz)



5.3 Emission Mask

5.3.1 Standard Applicable [FCC Part 95.635(e)]

For transmitters designed to operate in the MURS, transmitters shall comply with the following:

Frequency	Mask with audio low pass filter	Mask without audio low pass filter
151.820 MHz, 151.880 MHz and 151.940 MHz	(1)	(1)
154.570 MHz and 154.600 MHz	(2)	(3)

(1) Emission Mask 1—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: (i) On any frequency from the center of the authorized bandwidth foto 5.625 kHz removed from fo: Zero dB. (ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: at least 7.27(fd-2.88 kHz) dB. (iii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz: at least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.

(2) Emission Mask 2—For transmitters designed to operate with a 25 kHz channel bandwidth that are equipped with an audio low-pass filter, the power of any emission must be below the unmodulated carrier power (P) as follows: (i) 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. (ii) 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. (iii) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: at least 43 + 10 log (P) dB.

(3) Emission Mask 3—For transmitters designed to operate with a 25 kHz channel bandwidth that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows: (i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5 kHz, but not more than 10 kHz: at least 83 log (fd/5) dB. (ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 10 kHz, but not more than 250 percent of the authorized band-width: at least 29 log (fd^2/11) dB or 50 dB, whichever is the lesser attenuation. (iii) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: at least 43 + 10 log (P) dB.

5.3.2 Test Environment conditions

• Ambient temperature : (21 ~ 23) ℃ • Relative Humidity : (53 ~ 56) % R.H.

5.3.3 Measurement Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer.

The spectrum analyzer is set to the as follows

- RBW = 100 Hz
- VBW: >3xRBW

5.3.4 Test setup

Please refer 5.3.4

5.3.5 Measurement Result

please refer 5.3.6 for details

5.3.6 Test Plot

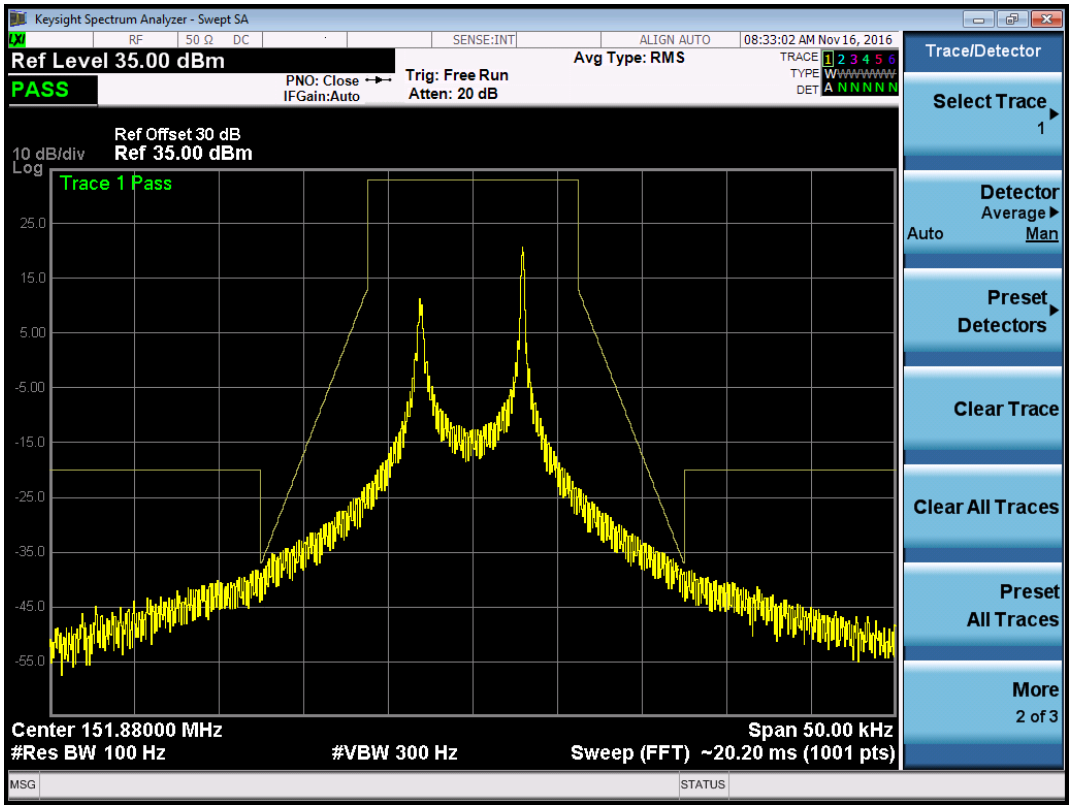
(1) Emission Mask 1—For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(i) On any frequency from the center of the authorized bandwidth for to 5.625 kHz removed from fo: Zero dB.

(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: at least 7.27(fd-2.88 kHz) dB.

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

(Ch2 : 151.880 MHz)



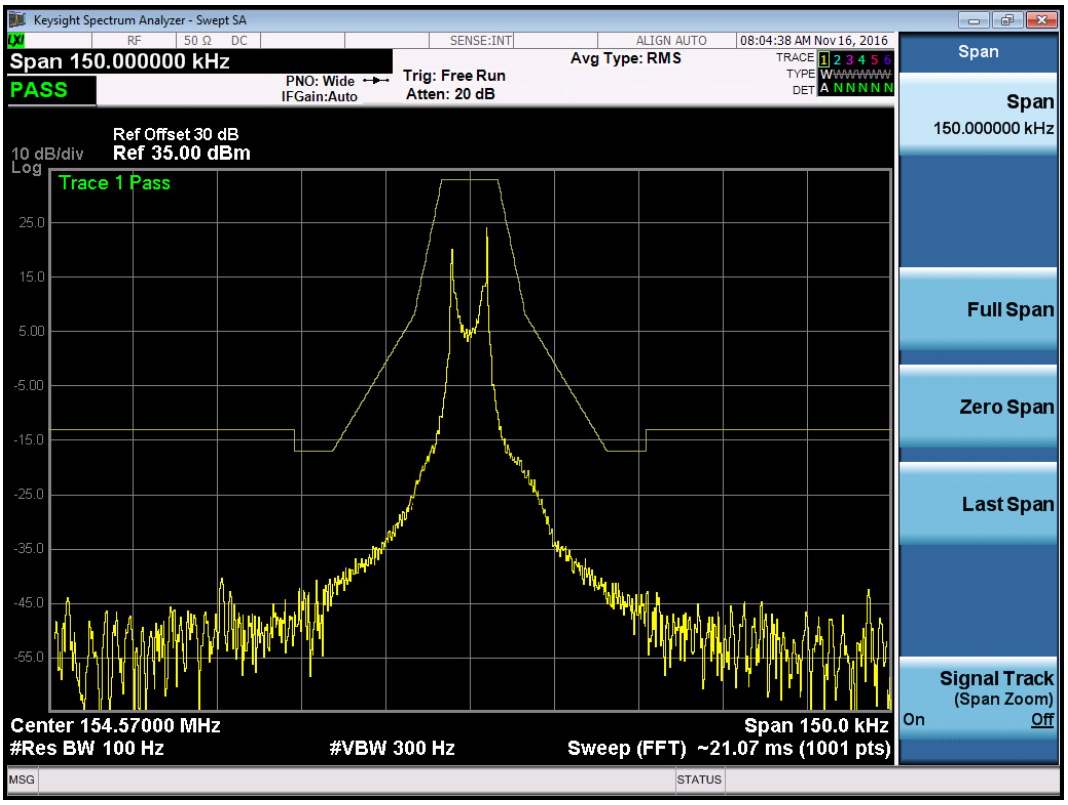
(3) Emission Mask 3—For transmitters designed to operate with a 25 kHz channel bandwidth that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows:

(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5 kHz, but not more than 10 kHz: at least 83 log (fd/5) dB.

(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 10 kHz, but not more than 250 percent of the authorized band-width: at least 29 log (fd^2/11) dB or 50 dB, whichever is the lesser attenuation.

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

(Ch4 : 154.570 MHz)



5.4 Transmitter Radiated Unwanted Emissions

5.4.1 Standard Applicable [FCC Part 95.635(e)]

According to FCC section 95.635(e), the unwanted emission should be attenuated below TP(transmitter power) by at least 50+10 log (TP) dB for 151.880 MHz and at least 43+10log(TP) dB for 154.570 MHz.

5.4.2 Test Environment conditions

• Ambient temperature : (21 ~ 23) ℃ • Relative Humidity : (53 ~ 56) % R.H.

5.4.3 Measurement Procedure

Conducted: The transmitter output (antenna port) was connected to the spectrum analyzer. The RBW set for 100 kHz and the reference level was adjusted to ensure the system had sufficient dynamic range to measure spurious emissions. The frequency range from 30 MHz to the 10th harmonic of the fundamental transmitter was observed and plotted.

Radiated; The EUT was setup according to ANSI/TIA 603D:2010 for compliance to FCC 47CFR part 95 requirements.

As a below test procedure (①~⑬), The result value of measurement is performed to condition of the below; The EUT will operate in continuous transmission mode during the time necessary to perform the measured of the frequency. Substitution method was performed to determine the actual P_{erp}(or P_{eirp}) emission levels of the EUT.

The following test procedure as below;

The test is performed in a fully pyramidal chamber to determine the accurate frequencies, after maximum emissions level will be checked on a test chamber and measuring distance is 3 m from EUT to test antenna.

① The EUT was set on with continuous transmission mode and placed on a high non-conductive table on the chamber.

② The test antenna is used on Bi-Log antenna at above 30 MHz, and used on Horn antenna at 1 GHz and then the measurements are repeated with the test antenna for vertical and horizontal polarization. The output of the test antenna will be connected to a measuring receiver, and it is set to tuned over the required standard measuring frequency range.

③ At each frequency at which a relevant spurious component is detected, the test antenna will be raised and lowered through the specified range of heights until an maximum signal level is detected on the measuring receiver.

④ The EUT is position x, y, z axis on rotating through 360 degrees in the horizontal plane, until the Max. signal level is detected by the measuring receiver.

⑤ The receiver is scanned from requested measuring frequency band and then the maximum meter reading is recorded. The radiated emissions were measured with requested standard specification (detector and resolution bandwidth etc.)

⑥ The EUT was then removed and replaced with substitution antenna .The center of the antenna was approximately at the same location as the center of the EUT, and calibrated for the frequency of the spurious component detected.

⑦ Signal generator output port connected with substitution antenna input port. If necessary, may use shield cable between signal generator and substitution antenna

⑧ The frequency of the calibrated signal generator is set to frequency of the spurious component detected, and the input attenuator setting of the measuring receiver was adjust in order to increase the sensitivity of the measuring receiver, if necessary

⑨ The test antenna was raised and lowered through the specified range of heights to ensure that maximum signal is received.

⑩ The input signal to the substitution antenna was be adjusted until an equal or a known related level to that detected from the transmitter is obtained on the measuring receiver.

⑪ The input signal to the substitution antenna was be recorded as a power level and corrected for any change of input attenuator setting of the measuring receiver

⑫ The measure of P_{erp}(or P_{eirp}) the spurious components is the larger of the two power levels recorded for each spurious component at the input to the substitution antenna, corrected for the gain of the substitution antenna, if necessary.

⑬ It is correction to signal generator's offset value. In this case of P_{erp}(or P_{eirp}) shall calculated as follow as formula ;

• P_{erp}(or P_{eirp}) = Signal generator level (dBm) – Cable loss(dB)

The compliance limit was calculated as the following table:

CH	Freq [MHz]	Max output power [dBm]	Required attenuation [dB]
2	151.880	31.32	50 + 10log(1.4) = 51.5
4	154.570	31.53	43 + 10log(1.4) = 44.5

5.4.4 Measurement Result (Conducted)

Channel Description	CH	Freq. [MHz]	output power	
			[dBm]	[W]
-	2	151.880	31.32	1.4

Emission Frequency [㎒]	Level below Carrier [dBc]	Margin [dB]	Limit [dBc]	Test Results
304.9	53.56	2.06	51.5	Compliance
456.3	55.35	3.85	51.5	Compliance

Channel Description	CH	Freq. [MHz]	output power	
			[dBm]	[W]
-	4	154.570	31.53	1.4

Emission Frequency [㎒]	Level below Carrier [dBc]	Margin [dB]	Limit [dBc]	Test Results
306.0	46.20	2.4	43.8	Compliance
460.4	57.70	13.9	43.8	Compliance

(Radiated)

Channel Description	CH	Freq. [MHz]	ERP power	
			[dBm]	[W]
-	2	151.880	31.32	1.4

Emission Frequency [㎒]	Ant Pol	Level below Carrier [dBc]	Margin [dB]	Limit [dBc]	Test Results
304.2	V	54.35	2.85	51.5	Compliance
455.1	V	70.53	19.03	51.5	Compliance
1 081	V	79.67	28.17	51.5	Compliance

5.5 Frequency Stability

5.5.1 Standard Applicable [FCC Part 95.632(c)]

MURS transmitters must maintain a frequency stability of 5.0 ppm, or 2.0 ppm if designed to operate with a 6.25 kHz bandwidth.

5.5.2 Test Environment conditions

• Ambient temperature : (21 ~ 23) ℃ • Relative Humidity : (53 ~ 56) % R.H.

5.5.3 Measurement Procedure

EUT connect to Spectrum analyzer, test is performed in T&H chamber.

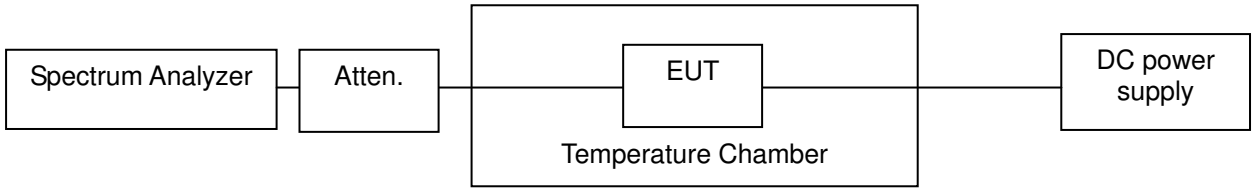
These measurements shall also be performed at normal and extreme test conditions.

▪ Test Method : ANSI/TIA-603-D-2010, clause 3.2.2 for frequency stability tests

-Frequency stability with respect to ambient temperature

-Frequency stability when varying supply voltage

5.5.4 Test setup



5.5.5 Measurement Result

(Ch2 : 151.880 MHz)

Temp(℃)	Power Supply	Measured Freq(Hz)	Freq Drift(ppm)
50	DC 3.7 (Vnom)	151 880 200	1.32
40	DC 3.7 (Vnom)	151 880 167	1.10
30	DC 3.7 (Vnom)	151 880 156	1.03
20	DC 3.7 (Vnom)	151 880 154	1.01
10	DC 3.7 (Vnom)	151 880 153	1.01
0	DC 3.7 (Vnom)	151 880 160	1.05
-10	DC 3.7 (Vnom)	151 880 150	0.99
-20	DC 3.7 (Vnom)	151 880 143	0.94
-30	DC 3.7 (Vnom)	151 880 083	0.55
Nom Temperature	DC 3.2 (Vmin)	151 880 154	1.01
Nom Temperature	DC 4.2 (Vmax)	151 880 152	1.00
Test Results		Compliance	

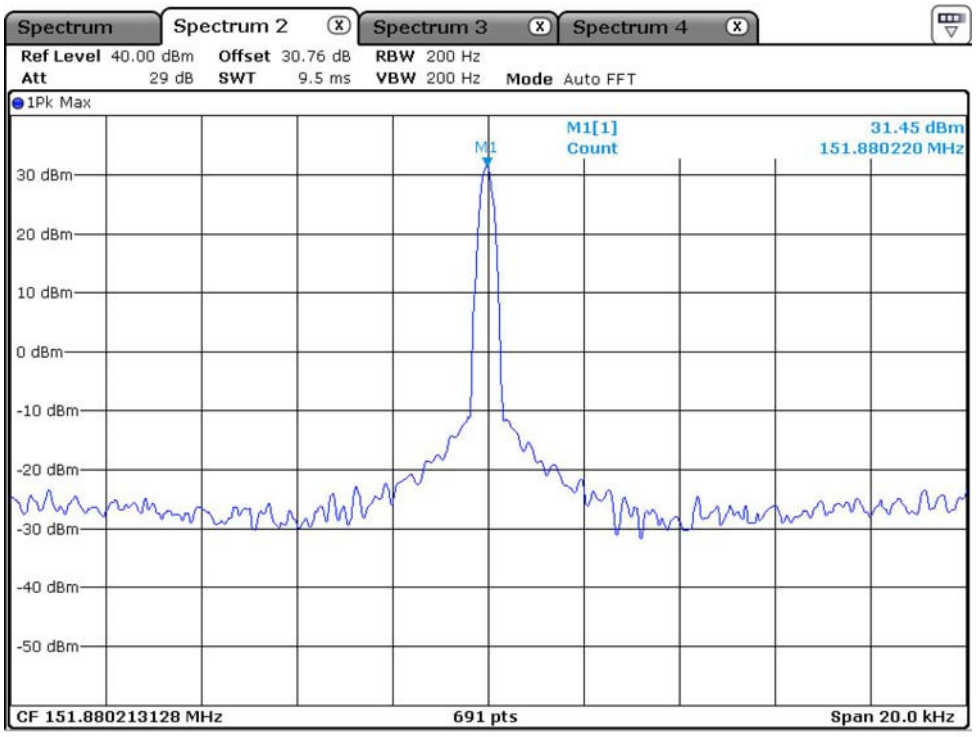
(Ch4 : 154.570 MHz)

Temp(℃)	Power Supply	Measured Freq(Hz)	Freq Drift(ppm)
50	DC 3.7 (Vnom)	154 570 215	1.39
40	DC 3.7 (Vnom)	154 570 168	1.09
30	DC 3.7 (Vnom)	154 570 146	0.94
20	DC 3.7 (Vnom)	154 570 148	0.96
10	DC 3.7 (Vnom)	154 570 150	0.97
0	DC 3.7 (Vnom)	154 570 149	0.96
-10	DC 3.7 (Vnom)	154 570 145	0.94
-20	DC 3.7 (Vnom)	154 570 110	0.71
-30	DC 3.7 (Vnom)	154 570 088	0.57
Nom Temperature	DC 3.2 (Vmin)	154 570 147	0.95
Nom Temperature	DC 4.2 (Vmax)	154 570 148	0.96
Test Results		Compliance	

5.5.6 Test Plot

*Worst case only

(Ch2 : 151.880 MHz)



(Ch4 : 154.570 MHz)